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ITHACA, N. Y.

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Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

TELEGRAM

April 17, 1916.

Senate passed amendment giving rank, including major, for veterinarians.

(Signed) D. E. BUCKINGHAM, *Chairman*.

VETERINARY LEGISLATION FOR THE ARMY

Veterinarians all over the country should be under a debt of gratitude to Congressman Hay for having carried the Veterinary Section of the Army Bill through the house for the third time.

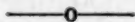
In the Senate, efforts are being concentrated to amend the Senate bill toward a more favorable attitude to the veterinarians. It is evident, however, that a very severe struggle is involved. The demands of the Dental Surgeons have not been pleasing to the Senate Military Committee and this has not predisposed the committee favorably in their attitude toward the veterinarians. We understand that the Senate bill at first took away rank from the Chaplains but that this was later restored. The social influence and prestige of the protesting clergy apparently had an influence

upon the committee. If the influence of the clergy has been favorable upon their representatives in the Senate it is likewise possible that the appeals from veterinary colleges and veterinarians generally may have a similar favorable bearing upon their representatives. We understand that a number of such appeals has been made and we trust will be productive of much good.

The Army Veterinarians should have rank and commission and their anomalous position terminated. If failure occurs in the Senate, it is hoped that what has been conceded in the House may be secured in conference. It is, nevertheless, gratifying to note that in both the House and the Senate, there is apparently a tendency to appreciate the necessity of giving recognition to the veterinarians. Pressure is effected by numbers. If all veterinarians will do their duty in the matter the pressure will be too great to resist. .

P. A. F.

[The foregoing editorial was already in type and the form nearly ready for the press when Dr. Buckingham's welcome telegram was received. Thanks are due the legislative committee and Dr. Hoskins, who has cooperated with it, and to the many veterinarians who contributed to the pressure, in securing this much desired and just result.—EDITOR.]



"ABOVE ALL NATIONS IS HUMANITY"

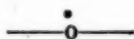
The first and greatest asset to an individual is life itself. Correlated with it is the pursuit of happiness. In the war-torn countries of the old world neither is at a premium. The scourge is widespread and all classes are affected. In the midst of it all and because the effects are so general, it is possible that the veterinarians of this country are prone to overlook, in the general disaster, the particular needs of their brother practitioners in these devastated areas. Many have lost not only a thriving practice but even their families and homes and the only asset left them is life itself. Such cases may perhaps be found in all the countries affected, but undoubtedly some are more seriously afflicted than others. The suffering is unparalleled and its acuteness is not mitigated by the distance intervening between our country and theirs. We may have our sympathies and we may have our dislikes for one side or the other, but suffering from any source speaks in the same tone and should appeal to the higher qualities of our inherent manhood.

Americans have ever been responsive to the effects of disasters

which have fallen heavily upon other nations and veterinarians are no exception to the general type. Although each nation, or its allies, in the present conflict, probably has some method or relief fund for alleviating those in acute distress, the suffering is so extensive and resources are so impoverished by the abnormal conditions that the aid rendered is of necessity limited. The veterinary profession is cosmopolitan. Brother practitioners who have lost their all, through no fault of their own, are worthy of generous consideration.

If there is any one organization whose keynote is humanity it is the Red Cross Society. If there is any organization which has the confidence of the people, it is this society. Its neutrality is unquestioned, for it is the suffering that appeals to it. Its worth has been tested and the distress it has alleviated, whatever the source, has brought many blessings upon it. America has been called the melting pot of the nations. In the veterinary profession there are doubtless many who take different sides as to the merits of the present conflict. There are doubtless many who would contribute to one fund but not to another. Let each contribute to the one which has his sympathy, and feel assured that the American Red Cross Society of Washington, D. C. will do its best to bestow the gift where the sender desires it to go. A contribution of this character is twice blest. It blesseth him that gives as well as him that receives.

P. A. F.



ASSAULTS ON LEGISLATION

There are doubtless many states where perennial attempts are made to change the veterinary law in the interests of those who have not conformed to it. The older the law and the stronger and more energetic the profession, the more difficult is it for illegal men to practice. Accessory laws such as the anti-narcotic, annual registration, etc., bring illegal practice more prominently into the light and doubtless also serve in some cases to stimulate some of the illegal men, who may have more or less political influence, to assault the law with the hope of being legislated into an honorable standing.

It is obviously unjust to require a high price of the present generation desiring to enter the portals of the veterinary profession and then legislate an easy side entrance for illegal men, who do not wish to pay the price, to compete with them. A customer has no right

to demand from his merchant that he be charged less than the cost required of other customers. There is a remedy for all illegal men, without invoking the most sinister type of class legislation, and that is to pay the legitimate price. They need not remain in the outer darkness. We have known illegal men who have had spirit enough to remove the taint; who have made up their educational deficiencies; who have spent additional time in a veterinary college and who have suffered some inconvenience in so doing. They have redeemed their own self respect and acquired that of their community and of the members of their profession. When the price is paid they are entitled to respect.

We cannot sympathize with those who desire to short step legitimate requirements nor can we sympathize with assaults upon established legislation which would substitute therefor class legislation of a most pernicious character. The "margin of safety" must not be diminished.

P. A. F.

POULTRY PRACTICE

In years gone by the medical profession ignored the psychological side of medicine and Christian Science arose to trouble it; massage was neglected and osteopathy arose to add to the trouble. Veterinarians have been inclined to ignore poultry practice and this in due time may arise to trouble them. We have heard of choice specimens of poultry that have sold for the price of a good horse or cow. Such specimens are just as liable to disease as the ordinary types. The owner of a hundred dollar cockerel is just as anxious for the amount of money invested in this form as he would be if it were invested in a horse. If the animal dies as a result of disease the loss is the same in either case. If the veterinarian can avert this loss the honor is just as great in the one instance as the other. Although high priced poultry of the type referred to may be exceptional such cases do occasionally occur. Poultry bringing the price of an average sheep or pig are more common and the owner of such specimens is just as anxious over their health as is the stockman over his animals.

Whether it be flocks of poultry, sheep or swine, epizootics are likely to strike them and cause severe losses. All are valuable as food products and should be safeguarded as much as possible. The

poultry industry is worth millions to this country. It is subject to ravages of contagious epithelioma, fowl typhoid, white diarrhea, internal parasites and various other troubles which may spell financial disaster in some sections. Veterinarians are the logical persons to consider and remedy these troubles. If they are derelict in their duty then we may expect the matter will be taken care of by others. Christian Science and osteopathy may not trouble the veterinarian—but poultry should be watched.

Not many years ago small animal practice, as a specialty, was a rarity; now it is common and profitable. Time is demonstrating that the veterinary is a comprehensive profession and that more opportunities for specialization exist than in the past. The veterinarian is the one to develop these opportunities and as they develop the profession becomes more attractive and more important in the minds of the general public.

P. A. F.

EUROPEAN CHRONICLES

Bois Jerome.

EQUINE STRONGYLIDOSIS. This is the name proposed for a parasitic disease of horses, which prevails in some parts of France and that Mr. Leneveu, a practitioner of Normandy, has had the opportunity to observe and study. He records his experience in the *Revue Generale* of Panisset.

The definition given by the author is that it is an apyretic disease, endemic in its form, generally beginning with symptoms of enteritis and giving rise to a progressive anemia. It is due to the presence, in the organism, of nematodes, of the family of the Strongylidae and to the genera of *Sclerotoma* and *Cylicostoma*.

Appearing towards the end of the year, rarely while the animals are at pasture but more generally when in stables, the disease presents symptoms that the author has divided into primitive and secondary.

The first consists of three principal manifestations: 1° Diarrhea, not severe at the beginning, the feces having a bad, and sometimes very disagreeable, odor. Worms, larvae and eggs of parasites are mixed with the discharge. Later this diarrhea becomes very severe. 2° Loss of appetite—progressive in its development, until it finally stops entirely. The animal refusing all kind of food

solid or liquid. 3° Loss of flesh. This takes place rapidly and is manifested in a peculiar way. The animal does not look as thin and meager as he is really, because the connective tissue is, in the majority of cases, the seat of an edematous infiltration, which fills up the spaces left empty by the fat.

As the loss of flesh progresses, the general condition changes, the muscles of the shoulder, back and rumps, become atrophied; the coat is dry and staring, the hairs of the mane are easily pulled out, the strength is lost and sometimes the animal has to be kept standing with slings to avoid skin sores from long lying down.

The secondary phenomena are: 1° edema, which is apparent in some cases, or again absent. In some instances it becomes very large and not infrequently gives to the animal the aspect of one suffering with purpura. These swellings are noticed on the extremities or about the head. They may also be seen on the upper parts of the body, gradually passing downwards. These are due to the weak condition of the circulation or again to thrombo-embolic complications.

With all these symptoms, there are also others of various nature, which may be due to toxi-infections or resulting from thrombo-colic embolisms or again from traumatic causes, such as cutaneous sores, internal hemorrhages by rupture of aneurisms, peritonitis by intestinal perforations through verminous abscesses or cysts.

Relative to the etiology and pathology of the disease, the author writes: Strongylidosis is due to the presence in the organism of equines of strongylidae belonging to the genera strongylus and cylicostomes. The species of parasites that are found at post mortems are: The *Strongylus vulgaris* of the great mesenteric artery, the *S. equinus* found in the cecum and principally the parenchymatous organs, the *S. identatus* also in the cecum. As for the Cylocostomes they live in the large intestines and are found there.

After considering briefly the pathologic action of the parasites, both in the larvae and the adult stages, Leneveu gives a review of the evolution and termination of the disease, its recovery, the chronic state, or death and then examines the lesions, of which he only presents the macroscopic exclusively, viz: 1° the intestinal, where are congestion, inflammation or verminous lesions, distributed more or less in every part of the small intestines, 2° the arterial, 3° the glandular and under 4th various kinds, such as

the anemic lesions, the metastatic, or the abscesses, the arthritic and infectious synovitis. Or again the mechanical lesions such as the intestinal and aneurismal ruptures.

The diagnosis of Strongylidosis of equines is always easy to establish, resting as it does on the following points: the time of the evolution of the disease, its endemic character and the careful notice of symptoms.

With Leneveu recovery is the rule if energetic and rational treatment is strictly applied. Of course, complications may occur and a guarded prognosis is advisable.

The treatment has for its basis, the three following conditions: 1—Place the subject in the best condition to repair the organic disorders due to the evolution of the parasites (hygienic measures), tonic medication, artificial serum, etc. etc.) 2—Destroy and eliminate the parasites as much and as quickly as possible (sulfuret of carbone, purgatives, sulfate of magnesia). 3—Treat the complications (caffeine, tonic serum camphorated oil injections, opiates, charcoal, bismuth, salol, etc.)

It is also essential to avoid reinfection by careful selection of the pastures, where animals can be properly watched and receive the care that their condition may require.

DIFFICULT DIAGNOSIS. The Veterinary News has recently published cases, where a diagnosis was very difficult and asks the profession to express an opinion on the nature of the cases, promising at a subsequent date to give an answer as revealed by post mortem.

The subjects and the questions were offered by one of the editors of the News, a practitioner of high repute and well known to the veterinary world. Mr. E. Wallis Hoare F. R. C. V. S.

It is certain that there is not a practitioner of medicine, human as well as veterinary, who during some time of his professional life has not found himself confronted with a case where, notwithstanding a most minute examination of the patient, a careful consideration of the manifestations and a thoughtful analysis of the symptoms, was obliged to acknowledge his inability to advance a diagnosis.

With our patients such conditions can to a certain extent be explained. The history given to us by those around the sick animal may be erroneous or imperfect. Our patients cannot talk and guide us as the human physician is. Although for one who has observed and listened, so to speak, to the language expressed by the

symptoms, this difficulty of our dumb animals has not as much importance as some think. To observe, to have read before of the symptoms, either in books or from the writings of others, to remember and to apply the knowledge thus obtained, the difficulties of diagnosis may be considerably reduced. The example given by the worthy editor of the News deserves much credit and is worthy to be followed by others.

The two cases of Mr. Hoare are here presented:

CASE No. 1. "Aged stallion, in moderate condition, within a "period of 18 months has had four attacks of impaction of the "colon. In this present attack which commenced on a Wednesday, "he had all the symptoms of dull abdominal pains. The case was "under the care of another practitioner until the following Sunday "when Mr. Hoare saw the animal. The following symptoms were "then manifested: Persistent pawing, sweating in patches, "looking towards the right flank, pulse quick and weak, respira- "tion accelerated, temperature 101° F., haggard expression, visible "mucosae injected, no tympany. According to the owner, had passed "small amounts of feces at irregular intervals. Rectal examina- "tion proved negative, beyond, revealing an excoriated condition "of the rectal mucosa due to the rough administration of enemas "by the owner. The animal showed a dull sleepy appearance with "eyes half closed. On administration of an enema, marked strain- "ing was manifested and muscular tremors occurred.

"From the general appearance of the animal and condition "of the pulse it was apparent that a fatal termination would short- "ly ensue. It occurred in the evening. No diagnosis was ven- "tured."

CASE No. 2. "Harness mare, six years old in poor condition. "Previous history: For six or eight weeks she had gradually lost "condition and within four weeks, she had a capricious appetite, "finally refusing all food for a day or so and then feeding in a list- "less manner. The owner tried various remedies without result. "One morning she had been driven a distance of 14 miles, but with- "in six miles of her destination she became weak and had to be led "quietly home.

"Clinical history. The mare showed material emaciation and "was hide bound. The pulse was quick and weak, the respiration "accelerated, the temperature 101.5° F. Examination of the "heart revealed weakness of the cardiac impulse but no abnormal

"sounds. Nothing was elicited by examination of the chest. For a few days the only symptoms observed were: slowness in feeding, accelerated respirations, anxious expression. The visible mucosae were anemic, and the temperature varied between 101° and 102° F. On the fourth day it ran up to 104° and free purging was observed also loss of appetite."

"The temperature ranged between 103° and 102° F. for the remainder of the time that she was under treatment. The purging abated after a few days and the patient fed at irregular intervals. Then purging started again, the mare manifested abdominal pain, lying down for long intervals, looking at her flanks and groaning occasionally. A few whiffs of chloroform put an end to her misery. No diagnosis was ventured."

It was in the issue of January of 1916 that these two cases appeared and one week later the answers, as obtained from the post mortems of the two animals, were given.

"In the first case the stomach and intestines were found normal. The liver was one-fifth its normal size. It was attached to the diaphragm by adhesions. The hepatic tissue was friable, resembled a sponge, and the entire organ did not show a trace of normal tissue."

"In case No. 2, the carcass was found devoid of adipose tissue. A large abscess was found in the gastro-splenic omentum and must have exerted considerable pressure on the gastric wall. The abscess contained a large amount of inspissated pus. The spleen was greatly increased in size. It weighed 24 lbs. A large number of abscesses were found in the base of the organ and the tissue of that region was infiltrated with growths of a whitish appearance, which unfortunately were not examined microscopically."

As Mr. Hoare suggests, it is to be hoped that the records of these, will induce others to present similar questions. They will increase our professional knowledge and help us, if not to relieve our patients, at least to inform their owners and advise them to their best advantage for the disposal of their animal, which in many instances may be of great value.

PYOCULTURE AGAIN. Can this application have the value granted to it by Prof. Delbet, in the prognosis and indication for the treatment of wounds of a certain nature?

This value has already been mentioned to the readers of the Journal, where its claims have been presented in comparison with

the opsonic index. If the properties offered by Prof. Delbet were realized, it is certain that great progress would have been made in surgery.

Notwithstanding the support it has received by experiments and successful opportunities of a few when pyoculture was resorted to it has met with strong opposition from several high authorities in surgery and general pathology, who have pronounced themselves entirely against the great claims made in its favor.

The *Presse Medicale* has recently published an article against it from Doctor Pozzy, a physician of high standing, who by the way is well known in the United States, where he asks: "Can pyoculture be made a practical and quick method to judge of the prognosis by the suppuration?" or in other words "Is it allowed to hope that, with precision, two antagonistic forces be measured, viz. such as the aggressive virulency of the microbes and the defensive power of the organism, by the comparison of what takes place in vitro, after being kept 24 hours in the hot air chamber, in a culture of bouillon in a tube or in a pipette filled with pus from a wound?" as Prof. Delbet claims.

Dr. Pozzy gives in review the history of the use of pus as a medium for culture, which is short and then gives the technic which he has followed in his observations and experiments. He continues by the classification of his observed facts, suppurations from war wounds or from light injuries. He relates the frequency of the results in both classes and of the presence of positive pyoculture and comes to the conclusions drawn in relation to the prognosis.

"The 28 cases of cultures of pus, which are published here, placed in face of the clinical observations, show that pus, taken from the organism, is generally speaking a medium for favorable culture for the development of the microbes that it contains, even when the organism defends itself and that the prognosis is essentially mild."

"Indeed, considering the first class of cases, it is noticed that they were all in severe injuries, for which the necessity of serious interference or a fatal termination was to be feared. And, with all, pyoculture having given a positive result, in peculiarly dangerous germs, (streptococci, anaerobics, various associations,) consequently a severe prognosis would have been justified and would have imposed the most mutilating interference."

"This pessimistic prognosis was not realized. All the degrees

"in the importance of the treatment were realized, notwithstanding
"the similarly positive pyocultures, often identical in quantity and
"quality. The clinical indications alone have been the guide for
"this or for that interference or again for entirely abstaining from
"it.

"In the second class of cases, with various suppurations, it is
"evident that no matter how convinced of the value of pyoculture,
"one might have been, no other treatment but the expectant was
"to be thought of, for such cases as abscesses of the breast, or of
"the rump, or of the forehead or arm-pit, already open, when the
"pyoculture was made. But with them a marked positive pyo-
"culture ought in all to have clouded the prognosis, either in some
"by revealing the presence of microbes particularly virulent or be-
"cause the organism did not defend itself. Most of these cases did
"not give rise to any anxiety and all recovered without special
"therapeutics."

To summarize, says Doct. Pozzy: "The incontestable fact is
that pyoculture in pipette may aid in putting in evidence and se-
lect in some cases the microbes of a wound, therefore assisting the
clinical examination, in a measure, where the bacteriological diag-
nosis may be useful to fix the prognosis. But to appreciate by it
the result of the fight between the organism and the microbes, the
answers generally obtained are more likely to misguide the surgeon
than to help him."

At any rate, the results obtained by other inquirers such as
Prof. Policard of Lyon, Doctor A. Carrel of New York, of Sir
Almroth E. Wright and others seem to endorse the objections pre-
sented by the writer of the *Presse Médicale*.

In a more recent discussion before the Society of Surgery,
Prof. Delbet merely answers the argument above described by say-
ing, that the 2000 satisfactory proofs that he will publish later will
answer the 28 different results obtained by his opponent.

BIBLIOGRAPHIC ITEMS—These are very limited, as I have re-
ceived only a few lately.

However, from the Bureau of Animal Industry, I have to be
thankful, for amendment to Regulations Governing the Meat In-
spection of the United States and also, Bulletin No. 340 on Experi-
ments in Vaccination Against Anthrax by Doct. Adolph Eichhorn,
Chief of the Pathological Division.

After a concise examination in the prevalence of anthrax and the methods of control, where due credit is given to Pasteur, who first discovered and applied a method of vaccination, and after proper and justifiable criticisms are made and also to other methods discovered by others, the author treats of the production of serum, of its standardization, of the preparation of spore vaccine, of the technic of administration, of the test made in cattle, sheep and use of the serum in the treatment of man, and comes to the following conclusions:

1—Horses are suitable for the production of highly potent anthrax serum. Serum of such horses should protect large animals in 10 c.c. doses.

2—The use of the serum-alone treatment is indicated in cases where the infection has already occurred in a herd. Since the serum confers only a passive immunity, it is advisable to revaccinate the herd in from three to five weeks by the simultaneous method.

3—The serum possesses great curative properties. Depending on the severity of the infection, the curative dose is from 30 to 100 c.c., the injection to be repeated if necessary.

4—For the simultaneous treatment a spore vaccine, carefully standardized, is preferable to the ordinary Pasteur vaccine.

5—Spore vaccine should be employed also in preference to the Pasteur vaccines for immunization with vaccine alone. This vaccine has a decided advantage over the Pasteur, because of the possibility of more accurate dosing and because of its better qualities.

6—Experiments with concentrated serum and dry spore vaccine are very promising. This method would greatly simplify the vaccination process and also insure the product against subsequent contamination and deterioration.

I have had also from Doctor Dalrymple a circular from the Louisiana State Live Stock Sanitary Board, giving a brief history of the Cattle Tick fight to date in that state, and which brings the reader to the great results obtained in the efforts made to be delivered of the pest which has been so injurious to the cattle of Louisiana.

A. LIAUTARD.

SHIPPING FEVER OF HORSES*

JOHN R. MOHLER, Washington, D. C.

INTRODUCTION. There is probably no disease of horses the etiology and differentiation of which are in such a chaotic condition as that pertaining to the various infections covered by the general term "shipping fever." There is already a very extensive literature on this group of diseases, and the determination of their causation has been the object of many researches, but with very conflicting results.

The term "shipping fever" is generally applied to any one of a group of epizootic infections of horses characterized by the presence of fever and presenting evidences of lesions in one or more tissues, with a marked tendency to spread to other susceptible equines. As this group of diseases usually occurs after the shipment of young western horses eastward or the transfer of "green" country horses to city stables, the term "shipping fever" has been adopted by many to cover any or all of the infections of this character.

All the large sales stables in our great cities are no doubt infected with these contagions, and the shipment of susceptible horses through these stables causes their subsequent owners untold losses every year. From an economic standpoint, these shipping fevers bear the same relative importance to the equine as tuberculosis and contagious abortion do to the bovine species.

Most authors recognize three distinct etiologic entities under the term "shipping fever," namely, strangles, influenza and contagious pneumonia. As early as 1862, Falke stated that two distinct infections should be recognized, one influenza, and the other typhus, now referred to as contagious pneumonia, and in the present day most writers separate these infectious diseases from each other as well as from equine distemper or strangles. Thus Huttyra and Marek in their third German edition, which has been translated into English, refer to a catarrhal and pectoral form of influenza as two different manifestations of the same infection, but in their recent fourth German edition they describe each as a distinct entity, referring to the former as influenza and to the latter as contagious pneumonia. However, it is well known that cases showing

*Presented at the meeting of the A. V. M. A., Section on Practice, Oakland, Cal., September, 1915.

uncomplicated influenza as well as those presenting evidences of strangles or contagious pneumonia may be met with in the same stable. In many instances the practitioner may even with the possession of considerable diagnostic skill and experience be unable to state definitely as to which of the above diseases the outbreak should properly be attributed. In fact, so many difficulties arise in connection with the differential diagnosis of these affections that many veterinarians for clinical purposes refer to them all under the heading of shipping fever. From a practical point of view, the question of differential diagnosis is not of so much importance as the necessity for attention to the preventive measures which should be adopted in all these infections.

While the evidence is not absolute as to the causal factor in any one of these diseases, the experiments of the Bureau give support to those investigators who believe that the *Streptococcus equi* of Shütz is the cause of strangles, the filterable virus of Poels the agent of influenza, and the cellular inclusions of Gaffky and Lührs the causal factors of contagious pneumonia. However, the question of the true etiology of these diseases requires much further investigation, and must be considered at the present time as unsolved.

EPIZOOTIC LARYNGO-TRACHEITIS. (INFLUENZA). For the purpose of opening this symposium, I shall refer more in detail to a catarrhal form of shipping fever which was so wide-spread in the United States about two years ago. Early in 1913 there appeared in the sales stables at the National Stock Yards, Illinois, what was reported to be an unusual contagion particularly among mules, although affecting horses as well. The disease spread rapidly to various sections of the country where infected animals were transported, with the result that reports of its occurrence reached the Bureau from various points extending from Texas to Delaware but more especially in Tennessee, North Carolina and Kentucky. The result of such wide-spread dissemination was to make this affection bear the same relative position of economic importance among equine diseases in 1913 as forage poisoning or spinal meningitis had occupied in 1912.

In the first of these cases observed, there was considerable swelling of the throat and intermaxillary space, with difficult breathing but no abscess formation even in those cases where the throat had been severely blistered. In the earlier stages there was a slight bilateral discharge from the nostrils which at first was watery

and later became mucoid or muco-purulent. During the onset of the disease the temperature ranged from 106° downward. Frequently the animals developed a short spasmodic cough which caused spasms of the larynx and suffocation relieved only by the tracheotomy tube. A marked tenderness of the larynx and trachea could be readily demonstrated. In other cases the first symptoms observed would be a depressed condition of the animal with a slight cough and a gradual enlarging edema of the throat and neck, sometimes extending down to the thorax, but more frequently involving the head which sometimes became swollen to a considerable size. These swellings did not appear to end abruptly as in purpura, nor did purpura intervene in any of the cases which came under my observation. In those animals showing extensive swelling of the head and throat the tongue protruded from the mouth and became paralyzed making it impossible to swallow either food or water. These conditions gradually became aggravated for from 3 to 5 days during which time pneumonia intervened with necrosis of the lungs noticeable by the offensive fetid breath. In some cases there was a pulmonary edema accompanied by the necrosis of the lung, and the picture then resembled that of contagious pneumonia.

On post-mortem the head was found to be very much swollen from the subcutaneous edema, the tongue protruded some inches, extensive necrotic tissue was noted on the base of the tongue, the soft palate and involving the pharynx and occasionally both guttural pouches. A sero-fibrinous exudate appeared in the intermaxillary space, on the head and in the anterior pectoral region. In one case produced experimentally by inoculating scrapings from the mucosa of the guttural pouch of another animal the horse died on the 9th day and on autopsy showed marked edema of the pharyngeal region with narcotic pneumonia. Where the swellings were present before death, the tissues were found to be filled with straw colored edematous fluid. Occasionally petechial spots were noted in the mucous membrane of the nasal septum. There was no pus found except in one or two cases complicated with strangles. If the animals did not succumb as a result of suffocation from the edema of the larynx, the lungs would show the usual picture of pneumonia with more or less pleuritic involvement.

The period of incubation of the disease appeared to be from 3 to 7 days. The outbreak was of a very virulent type and in many cases was complicated as has been stated, by the simultaneous pres-

ence of strangles and contagious pneumonia in the same stables. The cases assumed various forms in different parts of the country. In Delaware for instance, there were two outbreaks studied where the horses did not show marked laryngeal affection but the disease was just as fatal and the same organisms were isolated as from the heads of the Tennessee and North Carolina cases. As a result of the pathological and bacteriological study the diagnosis of epizootic laryngo-tracheitis was made because the symptoms bear a closer analogy to that affection as described in Volume II of Huttyra and Marek than any other described disease, but with the exception that this epizootic was of a much more virulent form, and from its widespread prevalence, contagiousness and symptomatology, it may be well described as a malignant type of influenza. It bears the same relationship to influenza as any other form of the disease such as pink eye, infectious pharyngitis, infectious bronchitis, etc., all of these affections being only varieties of one and the same etiologic entity. In other words equine influenza manifests itself in as many varieties of forms as does its human analogue, la grippe.

ETIOLOGY. Positive results from artificial infection experiments indicate that influenza is caused by a filterable virus which occurs in the blood and possibly also in other body fluids of affected horses, and which remains for a certain period of time in the animal after recovery.

After Dieckerhoff had succeeded many years ago in transmitting the disease by subcutaneous and intravenous inoculation of warm blood from affected horses, Poels accomplished the same results with fresh as well as with filtered semen of a stallion which had been infecting mares for months by the act of coitus. With the blood of artificially infected horses he further transmitted the disease even after the blood had been filtered through a Berkefeld filter. Later Lührs succeeded in transmitting the disease by subcutaneous inoculation of fresh or defibrinated blood, while Basset accomplished this also with filtered blood as well as with blood serum which had been kept for 4 months in an ice box. Similar results were obtained by Gaffky in his transmission experiments in which he observed the development of the disease from subcutaneous injections of 5 c.c. of both defibrinated and filtered blood in 5 to 6 days, and from intravenous injections in 4 days. On the other hand, the infectiousness of the blood was destroyed by the addition of citrate of ammonia.

From the blood and blood serum which had proved virulent for inoculations it was impossible to obtain cultures of any microorganisms.

The virus appears to be retained in the body of a horse for a long time in a virulent condition and stallions have transmitted the disease by coition months after they have recovered from the disease. In 1907, the Netherlands Government bought a stallion in France which was passed as sound. When put to stud, he infected every mare, the disease appearing 3 or 4 days later. Our experiments have demonstrated clearly that the filtered blood of influenza cases is capable of reproducing the disease in susceptible horses, while the inoculations of various bacteria recovered from such cases have thus far proved negative.

In several heads from animals dead of this malignant form of influenza complicated with contagious pneumonia received from Tennessee, there was an intense inflammatory edema, around the region of the larynx and pharynx, and in this edematous fluid were a limited number of hyaline lymphocytes enclosing protozoan-like bodies rod-shaped, pyriform or round in outline. In some of the cells of the greatly swollen pharyngeal lymph glands the same bodies were noted. These were probably the protozoan-like bodies found by Gaffky in cases of contagious pleuro-pneumonia considered by many as the causative agents of this type of pneumonia. This belief has been further strengthened by the splendid results which are being published in all the current German veterinary periodicals from the use of 606 (salvarsan and neo-salvarsan) since salvarsan is known to have great, in fact, specific therapeutic value in many of the protozoan diseases. When Ehrlich's attention was called to the almost specific action of 606 in contagious pneumonia, he expressed his belief that it was due to the fact that the disease in all probability was caused by a protozoan. For a concise review of the salvarsan and neo-salvarsan treatment of contagious pneumonia, you are referred to an article by Schwartzkopf in the *American Veterinary Review* of February, 1914, page 634.

TREATMENT. The fatalities from epizootic tracheitis two years ago were very high, although the usual methods of treatment were adopted. These consisted of hot and cold applications, antiphlogistine and mustard poultices, blisters and liniments externally, and bacterins, antitoxins, phylacogens, adrenalin chloride, nuclein solution, strychnine, potassium chlorate, tincture of ferric chloride,

heart stimulants, febrifuges and astringent mouth washes internally.

The vaccine treatment for influenza is being given great publicity in this country at the present time and is more extensively used for this affection than for any other disease in horses.

Various manufacturers of biological products prepare bacterial vaccines for immunizing and curative treatment of influenza. The organisms which enter into the preparation of the vaccines vary not only as to the species but also in the number contained per c.c. All bacterial vaccines prepared for the treatment of influenza contain streptococci isolated from cases of influenza in horses in very large proportion as compared with the number of other organisms used in these preparations. Of the other organisms the staphylococcus, pneumococcus and bacillus coli communis are used. Besides, one manufacturer adds to the preparation an unidentified rod-shaped bacillus isolated from cases of influenza, and another a bacillus which has been claimed by Dr. Lintz of the Long Island College Hospital as the etiological factor of the disease. Its relation, however, to the disease, has never been satisfactorily demonstrated, and therefore its presence in the preparation is of an unknown value. As we received a number of letters from veterinarians regarding a certain vaccine prepared at that time solely from this so-called Bacillus Lintz, I will elaborate more fully on this phase of the subject.

In the first place Lintz, in his article, (Footnote: *Journal of Experimental Medicine*, Vol. XVII, No. 5, 1913, page 511), confuses distemper in horses with influenza. Distemper of horses should be used synonymously only with strangles in horses. The evidence brought forward by Lintz to incriminate the Bacillus of Lintz as the causative agent of influenza in horses is very inconclusive. This evidence is based upon three propositions:

1. The isolation of the organism from a horse that succumbed to influenza;
2. The agglutinating power of serum of affected horses for this organism; and
3. The value of the vaccine as a therapeutic and prophylactic agent.

The experimental evidence set forth under the first proposition is based on a single incomplete experiment. The author isolated from the lungs, heart, blood, spleen and kidney of a horse that succumbed to the disease the Bacillus of Lintz, together with a pneu-

mococcus. He found that colonies of *Bacillus* of Lintz were more numerous than those of the pneumococcus. This is not strange, since the *Bacillus* of Lintz is a very profuse grower, while the pneumococcus is just the reverse. One horse was injected intravenously with an agar culture, and 24 hours after the inoculation the temperature rose abruptly to 105 degrees F., the horse refusing nourishment, and exhibiting marked signs of weakness and constipation. The temperature fluctuated between 103 and 106 degrees for three days, gradually returning to normal at the end of five days. No attempt was made to recover the organism. The disturbance exhibited in this experimental horse was probably a result of protein poisoning. This contention is evidenced by Lintz's own experience with the vaccine upon normal horses when he states, "They reacted in various ways, some being slightly, if at all affected. One reacted violently, the temperature rising to 105 degrees F. ten hours after the injection, and presented all the symptoms of the accustomed disease, subsiding gradually to normal at the end of four or five days."

On two different occasions we failed to produce the disease by injecting susceptible horses intravenously with a culture of the *Bacillus* of Lintz grown on four agar tubes. About thirty minutes after the injection of the first horse, the respirations and pulse became greatly accelerated and the temperature raised from 101° to 102.2° F. Two hours after injection the temperature had reached 103.6° F. That night the animal refused its feed. The next morning the fever had subsided and the other symptoms had also abated.

The second horse was injected two months later with a fresh culture just received from Dr. Lintz's laboratory. One and three-quarter hours later the temperature had risen from 100.1° to 103.4° F. with slightly increased respirations and pulse, which quickly subsided and on the following day the animal showed no symptoms which could be attributed to the material injected.

It seems evident that the sudden onset of symptoms without any definite period of incubation was the result of a protein poisoning rather than from the multiplication and activities of the injected organism. A bacteriological study of this *Bacillus* of Lintz shows it to belong to the colon-typhoid group of bacteria, as it was found to be a motile, non-Gram staining, non-liquefying bacillus, fermenting dextrose and lactose, but not saccharose, and acidifying, but not coagulating milk.

Furthermore, this classification of the bacillus is corroborated by the previously mentioned results obtained by Lintz in horses injected with the dead bacilli in the form of a bacterin, as it is well known that the toxin of this class of bacteria is endo-cellular in nature and the injection of dead bacilli produces symptoms almost equal in severity to those induced by injection of the live organisms.

The preponderance of evidence appears to be in favor of an ultravisible microorganism as the cause of influenza, the lowered vitality occasioned by this virus paving the way to infection with the colon bacillus, cocco-bacillus, *B. necrophorus*, *B. pyocyaneus* staphylococcus, pneumococcus and most important of all the various species of streptococcus. The frequency of these streptococci as secondary invaders in animals dead of influenza has caused the various biological houses to use as many strains of these organisms as possible in the preparation of their polyvalent influenza bacterins.

Antistreptococcic serum is also being used to a considerable extent in the treatment and prevention of influenza, although it does not enjoy the popularity of the bacterial vaccines. This no doubt is primarily due to its greater cost and also to the greater inconvenience which the treatment with serum involves. In foreign countries the serum treatment is given preference to vaccine therapy. It is natural that for curative purposes better results may be expected from the serum treatment than from the bacterial vaccines, since through the introduction of the antistreptococcic serum large amounts of immune bodies are injected into the animal, which immediately act favorably upon the disease. It is required, however, that a considerable quantity of such serum should be injected as antistreptococcic serum does not appear to be effective when employed in small quantities. The immune bodies which are injected with the serum exert their action upon the disease and after being used up, or after their elimination from the body, there remains nothing to continue to stimulate the production of additional protective substances in the animal. Therefore in the serum treatment it is often necessary to repeat the injections until favorable results are apparent. On the other hand, with the bacterial vaccines the results are not immediate, since the dead organisms injected into the animals require a certain period of time to stimulate the body cells in producing protective substances, and they remain in the body fluids for a longer period of time, acting continuously.

The results obtained from the treatment of influenza with

certain biological products appear to be in general satisfactory. The actual value, however, can not be definitely established as the available data can not be considered as absolute evidence of the potency of this method of treatment. It may be that a veterinarian in practice will immunize a certain number of horses against influenza and if the disease fails to develop he naturally attributes it to the treatment, while as a matter of fact it may have been the result of absence of sufficient exposure or to a resistance of the animals against existing exposure.

The virulence of the disease must also be given consideration in this respect since quite frequently the infection appears to have a very low virulence and the animals affected show only a mild type of the disease, whereas at other times it appears in a very severe form when pectoral complications are especially prevalent, and in consequence the mortality is greater.

Since the etiology of equine influenza is not satisfactorily established and since it appears that the causative factor of the disease is an ultra-visible microorganism, the treatment with biological preparations as employed at the present time does not seem to have a close relationship to the original cause of the disease. Nevertheless we should not overlook the fact that the favorable results which are reported from the use of bacterial vaccines must have some connection with the pathogenicity of the disease. The action of the bacterial vaccines as used at the present time is chiefly to assist in preventing or controlling the secondary infections which are invariably associated with influenza, and this opinion is substantiated by the fact that the influenza vaccines when injected in the early stages of the disease frequently result in a mild type of an attack with shorter duration.

It will require closer observation and more accurate data to establish definitely the value of bacterial vaccines for the treatment of influenza, but even at the present time their use appears justified, especially for the purpose of allaying the possibility of severe complications.

The manufacturer of biological products for interstate commerce has been under the control of the Department of Agriculture since July 1, 1913, and even in this short time a great deal of important work has been accomplished, not alone as to the method of their preparation, but also in eliminating such products in the preparation of which bacteria have been used which have no relation to the disease.

As the use of some of these biological products in the treatment of domestic animals can not be considered as established on a solid foundation, the real therapeutic value of many of these preparations can be determined only by testing the different products on a very large scale. The cooperation of practicing veterinarians is very essential in this regard, since only by careful observations and compilations of the results can the worth of any method of treatment be estimated.

The prevention of influenza must naturally play an important part in the control of the disease. Infected animals should be separated immediately from healthy horses. The principal source of the spread of influenza is without doubt in the sale stables and feeding barns, and accordingly periodical disinfections of these places would greatly diminish the danger from these sources. Further, disinfection of cars in which horses from such infected stables and barns have been shipped would be an important factor in the prevention of the spread of the disease. In the not distant future Congress will no doubt see fit to authorize the Bureau of Animal Industry to supervise the shipping of horses infected or exposed to influenza and the disinfection of contaminated cars, in the same manner as is being done today with cattle mange, hog cholera, sheep scab and Texas fever. A beginning has already been made in cooperation with the State of Kentucky, which by proclamation quarantined against all horse stock coming from St. Louis and the National Stock Yards, unless the animals had been inspected and the shipments made in disinfected cars approved by the Bureau. This cooperation has resulted in a marked reduction of shipping diseases, according to the statement of State Veterinarian Graham, and if other states would likewise quarantine against those horse centres whence their greatest amount of infection originates, I am sure the Bureau will cooperate to the fullest extent of its power.

BACTERIOLOGY OF CATARRHAL FEVER, STOCK YARDS FEVER OR SHIPPING FEVER*

A. T. KINSLEY, Kansas City, Mo.

The existence of an infectious transmissible disease of solipeds which passes through public stock yards, sales barns and those transported by rail or transport, is common knowledge to horse dealers, shippers and veterinarians. The exact identity of this disease has not been determined. It is an acute infectious disease characterized by catarrhal inflammation of the anterior respiratory tract, with or without suppuration of related lymph glands and is frequently associated with pneumonia or pleuro-pneumonia. For convenience the uncomplicated form is usually designated as the catarrhal form and the complicated type as the pectoral form.

Catarrhal fever is very prevalent throughout the United States and other countries. As the name implies the disease is more prevalent in horses that are marketed and more particularly those that are shipped, although it sometimes becomes enzootic in agricultural communities. The percentage fatality varies from one to sixteen. The high percentage fatality occurs in the pectoral form, that is, in those cases that are complicated with pneumonia. The percentage of fatality, although rather high, is not as serious as is the depreciation due to loss of condition of the affected animals and the further loss of time and amount of feed necessary to put the animals back into condition; and again the disease frequently leaves the animals defective in some ways, as cardiac disturbances, emphysema, etc. Economically considered this disease probably costs the horse industry more than any other disease.

The disease under consideration is not the old type of disease known as "pink eye" or influenza, although the two diseases may occur simultaneously. The infectiousness of shipping fever has been recognized since about 1850, but the exact specific cause is still a mooted question.

A variety of microorganisms have been identified with catarrhal fever and probably the large number of microbial agents that occur in this disease explains the multiplicity of lesions that characterize the disease. Although results were not published, the author

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made some preliminary bacteriologic investigations in 1902-3 and in 1915 in Kansas City, Missouri. The following bacteria were identified:—streptococcus, micrococcus, (staphylococcus) pyogenes aureus, albus and citreus, bacillus pyocyaneus, pneumococcus, micrococcus catarrhalis, bacillus coli communis, and a variety of contaminating non-pathogenic bacteria. The foregoing bacteria were isolated from the nasal and ocular discharges, tracheal smears and jugular blood of the living animal and from lesions of the lungs, bronchial tubes and pleura in the carcasses of animals that were autopsied soon after death.

Streptococci were identified in the nasal discharges in over 80% of the cases showing catarrhal condition of the anterior respiratory tract. The same or a very closely related organism was obtained in the blood from 40% of the cases affected with the catarrhal type of the disease. These streptococci were identical microscopically and culturally to a streptococcus that was isolated from the pus of a submaxillary abscess of a colt affected with strangles. Intraperitoneal injections of the streptococci that had been recently isolated from either the nasal discharges or the blood produced purulent peritonitis and in one instance pyemia and death in a guinea pig. The injections of recent cultures subcutaneously in old horses usually produced abscess formation in from 2 to 5 days.

Of the ordinary pyogenic micrococci (staphylococci), the albus was most prevalent, having been identified in the nasal discharge in 30% of the affected animals. This organism was not isolated from the blood of a single case affected with catarrhal fever, although it was obtained from the bronchial tubes and lung lesions in two of the cases that were autopsied. Experimental inoculations with the *Micrococci pyogenes albus* resulted in the production of abscess in experimental guinea pigs and an intense subcutaneous inflammation with an occasional abscess formation when injected subcutaneously in old horses.

The *Micrococcus (staphylococcus) pyogenes aureus* was identified in a fraction less than 9% of the nasal discharges of affected horses. This organism was isolated at autopsy from the lung in one case only, and it was not obtained from any blood cultures. The experimental inoculations of the aureus proved its pus producing capacity in guinea pigs and less constantly in horses.

The *Micrococcus (staphylococcus) pyogenes citreus* was obtained in the nasal discharges in only two instances. It did not develop

in any of the blood cultures neither was it isolated from any cultures made at autopsies. The two cultures of *Micrococcus (staphylococci) pyogenes citreus* isolated had a very low pathogenic power as evidenced by the inoculation experiments.

A diplococcus which was identified as the pneumococcus was obtained in two instances from blood cultures and from the lung in practically every case autopsied that was affected with pneumonia. This organism showed uncertain and irregular pathogenic power in the inoculation experiments.

The *Bacillus pyocyaneus* was isolated from the nasal discharges in two cases and from a necrotic pulmonary center. Experimental inoculation produced fatal peritonitis in a guinea pig in three days. The cultures of this organism showed the characteristic pyocyanin staining of the culture medium.

The *Bacillus coli communis* was identified in approximately 30% of the nasal discharge cultures, in 10% of the cultures made from lung lesions at autopsy but it was not obtained from the blood in a single instance.

An organism very similar and possibly identical to the *Micrococcus catarrhalis* was isolated from the nasal discharge in one instance. It was probably an accidental contamination possibly obtained from the culture taker.

Several non-pathogenic microorganisms such as the *B. subtilis*, *B. proteus vulgaris*, *B. megatherium*, *Sarcina lutea* and other unidentified varieties were obtained particularly from the nasal discharges, the *B. megatherium* being obtained, probably as a contamination, in one blood culture. A bipolar staining microorganism was obtained in one blood culture but was considered a contamination. The above findings were the results of the study of 42 cases of catarrhal fever. These cases were in various stages of development, as they represented cases as they occur in a routine practice. The nasal cultures were obtained from the nasal mucosa about 4 inches above the opening of the nostril and after cleansing the external surface with dry cotton. The blood cultures were made from the jugular vein after saturating the skin with alcohol or tincture of iodine. The autopsy cultures were obtained from bronchi or lung lesions immediately after incising the part. Agar, serum agar and bouillon were the usual culture media used.

Ferry reported his findings of bacteriologic investigation of catarrhal fever in a paper presented to the American Society of

Bacteriology in December, 1911. From this report and more recent literature Ferry gives the streptococcus preference in the causation of catarrhal fever. Schütz in 1888 described the *Streptococci equi*, Sand and Hensen independently described the same organism claiming it was the cause of strangles.

Lignieres and previously Babes have claimed the exciting cause of catarrhal fever was a bipolar staining microorganism belonging to the hemorrhagic septicemia group and the name *Pasteurella equi* has been suggested.

It has been suggested that a filterable virus is the specific cause of catarrhal fever and in this relation Poel's observation is of interest. He observed a stallion that transmitted the disease by copulation. This transmission continued for months. The semen from this stallion either entire or the filtrate transmitted the disease and the filtered blood of infected animals also proved infectious.

That pyogenic bacteria of the various kinds that have been identified in this disease, are a factor, cannot be disputed. Streptococci are frequently responsible for suppuration of lymph glands as is evidenced in colt distemper or strangles and it has been found that streptococci are usually present in the pus of those cases of catarrhal fever in which suppuration of lymph glands occur. Again it has been demonstrated that the percentage of cases in which there is suppuration of lymph glands can be diminished if not entirely prevented by immunizing susceptible animals with a streptobacterin. The intensity of the catarrhal inflammation is also materially diminished by the immunization of horses with large doses of mixed bacterin prior to their exposure to catarrhal fever. Pneumonic complications can be largely avoided by the immunization with a mixture of streptococci and pneumococci bacterin. In fact the complications of this disease, that is, suppuration, pneumonia, and pleuro-pneumonia can be diminished if not entirely prohibited by immunization with a bacterin composed of the usual microorganisms causing the complications and thus diminish the fatalities of this disease. This immunity is not of long duration as exposed immunized animals may become infected in from six weeks to six months. However, it must be concluded that the various identified microorganisms are probably not the only etiologic factors of shipping fever.

THE TREATMENT AND MANAGEMENT OF SHIPPING FEVER IN RURAL DISTRICTS*

J. D. FAIR, Millersburg, O.

The extent of my experience in the treatment and management of shipping fever and other serious febrile diseases, as a result of transportation from the farm through shipping centers and again taken to the farm and the tendency of other horses of the farm to which they are taken, to contracting the same or similar disease, has been very extensive.

I remember one year, one of my patron's business, which was the buying, selling, feeding and shipping of horses, amounted to over one million of dollars; also six other patrons that bought and sold horses by the car load. Those men bought their horses in Iowa, Illinois, Indiana and Ohio, shipped them to Chicago, lashed them through the Chicago auctions and if the prices were not satisfactory they were reloaded and brought to Millersburg, Ohio, and sold on the block, while others were distributed among the farmers, to be developed for the eastern markets. Fifty per cent of those horses contracted shipping fever and other febrile diseases and infected fifty per cent of the horses on the farms to which they were taken.

The etiology, pathology and bacterial findings of shipping fever have been ably discussed by Drs. Mohler and Kinsley, and I will direct my attention to the treatment and management. The best methods of shipping to prevent further infection, and the preparation and treatment after arriving at their destination.

In the first place I advise a change in shipping. Instead of going to the various horse markets to buy the horses, go direct to the farmer and have him deliver the horses to some shipping point. Instead of shipping by freight, the conservative dealer will ship by express, in a car that is clean, well bedded with hay and somewhat disinfected. Those shipments are rapid and when once started usually go to their destination without unloading or even much delay. When horses are shipped by freight, or otherwise, the first few hours they are excited, nervous, they fight and crowd until they perspire freely, and if shipped by freight, they are usually

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left on some siding, exposed to drafts, and when started they heat up again, thus preparing the field for the development of "shipping fever, influenza and various complications." If unloaded and left to stand in some sale barn, and lashed through an auction, shipping fever is almost sure to follow, and if those horses are distributed among the farmers the infection is invariably spread to the horses on the farm, wherever they are taken.

During latter years the most of our feeders were advised to prepare special stabling, separate and apart from their main feeding barn, and to provide water in special buckets, until they recover and are acclimated. In this way you can partially prevent the infection to other horses that may be feeding or are otherwise used upon the farm.

If the season is favorable, we keep the horses in the open, turn them to grass, plenty of fresh air, water and light grain rations, and if with precaution, and under this management they develop shipping fever and the many complications, I proceed to give them the following treatment.

I always considered that shipping fever was due to a mixed infection, the germs having a particular desire to search the nervous system, and if their attention and efforts are directed to one particular organ you have a complication to deal with, besides the general debility and prostration.

In my opinion there is no specific or set line of treatment. The patients must be seen and a physical and clinical examination made and such treatment prescribed as the conclusion of the examination would suggest.

First we place the patient in a good box stall, clean and well ventilated, everything in a good sanitary condition, clothe the patient to suit the season of the year, offer choice laxative food also fresh water in a clean pail. The feed and water I consider very important, also the nursing of the patient. The administering of the medicine must be at regular intervals day and night. Good judgment is a great factor in the successful treatment of shipping fever.

When I find a horse with a temperature of 106 to 107, pulse 60 to 72, the respirations rapid, uneasy, shifting of the limbs, general debility, congestion of the upper air passages, just recently shipped, I wrap him in good blankets, administer a diaphoretic, diuretic, febrifuge and stimulant, and locally I apply a good sharp liniment

to the throat, from ear to ear, to the breast and over the lungs. I do this effectively. I want the patient to dance and perspire freely, and as a rule in twenty-four hours time you have aborted the disease or at least lessened the danger of complications. If I find a rapid rise of temperature the second or third day, I again repeat the process of sweating and my theory is this: I distribute the force, determination and tendency towards any particular part or organ and at the same time eliminate a great deal of poison. Generally speaking I usually prescribe as follows:—

Quinine sulphate	½ oz.
Hydrochloric acid	1 dr.
Sol. strychnia sulphate	2 gr.
Fluid ext. digitalis	2 dr.
Fluid ext. jaborandi	6 dr.

Spr. Frumenti, add q.s. to make 8 oz. Sig:—One ounce every three hours with ounce of water. I always give a laxative, viz:

Aloin	30 gr.
Strychnia	⅛ gr.
Calomel	15 gr.

also nitrate and chlorate of potash in the drinking water. I modify this treatment, as I said, before the physical and clinical examination suggests the treatment. After the patient has passed through the acute stage I then give him tonics and stimulants with plenty of fresh air and exercise. I might go on and write on many complications, but time forbids. However, I will call your attention to one: pleuro-pneumonia. If I see a patient in the early stages I always apply a good mustard blister. I use one pound of Coleman's mustard. I make a thorough application and cover well with table oil cloth, fasten well with two surcingles and leave in position for three to four days. I hold that this serves a triple purpose. 1st. As a result of the irritation, I expect diaphoresis to follow and this has a tendency to relieve the congestion. 2nd. If the external irritation is greater than the deeper seated, the lesser will yield to the greater. 3rd. Again it serves as a good hot poultice for three or four days. After this I remove the mustard and try to determine whether I have or am going to get an effusion; if an effusion, aspirate early and repeat if necessary. The medicinal treatment should consist of heart and diffusible stimulants with potass. iodide in the drinking water. Stimulate the appetite, cre-

ate all the power of resistance possible. By this treatment, sometimes varied, I have been able to save a fair per cent of cases.

When you find that peculiar complication of influenza affecting serous membranes and especially the parietal pleura and pericardium, and rarely showing any catarrhal symptoms, a very fatal form, the per cent of mortality runs very high. I never associate this form with shipping fever and consider it a subject by itself and not under the heading of this symposium. If I find a case having a tendency to transudation, dropsical effusion, great swelling of the legs, infiltrated conjunctiva, commonly known as pink eye, it is not considered so fatal, however, the financial loss, if the same be neglected, is great. Special attention should be given to the treatment of the eye. There should be persistent bathing of the eye with hot water at least two or three hours. After bathing I usually place one grain tablet of quinine-urea in the lower canthus of the eye, after this I use the following preparation:—

Adrenalin	gr. $\frac{1}{4}$
.Zinc sulpho-carbolite	gr. 8
Boracic acid	grs. 8
Atropia sulphate	gr. 1
Aquae dist.	oz. 1

Of this solution I drop a portion into the eye every three to six hours. It is necessary to give a laxative, and the surest way is to give,

Aloin	30 grs.
Strychnia	$\frac{1}{8}$ gr.
Calomel	15 grs.

every three hours until you get a free action of the bowels, then this part of the treatment may be discontinued.

I call your attention to this form of the disease for this reason, it is considered by many veterinarians and horse owners as rather a simple trouble. But when you know that a neglected case of conjunctivitis or catarrhal ophthalmia leaves a defective eye or a predisposition to recurrent attacks and finally total blindness, it calls for prompt action.

In my years of practice I have seen many horses go to market with defective eyes and on some farms nearly every horse blind, largely the result of carelessness and for want of proper and prompt treatment. Of course I give those cases of "pink eye" other treatment, such as, febrifuges, stimulants and diaphoretics:

whatever treatment they need. But I wish to impress upon your minds that it is very important to relieve the morbid condition of the eyes as early as possible.

Shipping fever complicated with spinal meningitis or congestion of the spinal cord: this is a serious complication. Those cases are up and down, and when down lie flat. They get up but stand only a short time and go down in a heap. They lie too much and finally develop passive pneumonia, become unable to rise and finally succumb to the disease. The only suggestion I have to offer is to put those cases in slings before they get too weak and have the nurse apply hot packs, counter-irritants, etc., mostly to satisfy the owner. I have no particular line of treatment to recommend, simply treat the conditions as you find them. I might write on other complications or the result of morbid conditions arising from shipping fever, but do not consider them of particular interest.

I was requested to give my opinion of the vaccines and antitoxins for the prevention and treatment of shipping fever. I will give my opinion from my observation and actual experience with the treatment.

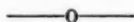
Some of my eastern friends said, "We have no sick horses since we vaccinate them". I could not reason that way but concluded to give polyvalent bacterins, antitoxins and vaccines a fair and impartial trial. I provided myself with vaccines made by different drug firms and other vaccine laboratories and followed out the preventive and curative treatment of shipping fever, influenza and pneumonia. With me the treatment proved a failure. Horses that I immunized and were shipped to the eastern market, developed shipping fever, etc., others that I immunized that were not shipped developed shipping fever and complications to as great a per cent as those that were not immunized.

I remember particularly one ear load of horses that were bought in Iowa, vaccinated, shipped to Chicago, unloaded and put through the auction. Prices not being satisfactory, they were reloaded and brought to Millersburg. Practically every horse developed shipping fever, influenza, pneumonia and other complications, and the curative treatment was no more satisfactory than the immunization. I do not wish to discourage biological treatment but rather encourage it, and I hope that the products will be standardized so that they are reliable and can be used with confidence and success.

During the past few years I have treated cases of shipping fever,

and distemper. Cases having a discharge of pus from the nostrils and other pus formations, by following out Dr. Charles H. Duncan's theory of autotherapy. In my opinion vaccine or toxin, prepared and used in this way, seems to me more plausible and has proven more effectual than any laboratory vaccine that I have used.

In conclusion, I will say use rapid and direct transportation, avoid exposure to infected barns and districts, distribute them as much as possible, give them plenty of fresh air and keep them moving; this has proved to be the best preventive management, and if they contract disease, prompt medicinal treatment so prepared to meet the indications and counter-indications of each individual case, with careful nursing, good surroundings has proven to me to be the best in the *treatment and management of shipping fever in rural districts.*



ABSTRACT OF DISCUSSION

DR. O. A. LONGLEY: Shipping fever on the Pacific coast is unimportant. I will not say that shipping fever, as we commonly call it, never exists on the Pacific coast. It does exist to some extent but it has been of such a mild type that it responds very readily to treatment. It is very rarely that any precautions are taken in shipping horses up and down the coast. Horses of Washington and Oregon are very commonly interchanged and shipped into California and many carloads of horses go out of California into other states and very rarely is there any trouble in these shipments in the way of shipping fever. The precautions taken are usually those taken for shipping out of any large shipping center like San Francisco and Los Angeles—using the ordinary test for influenza, antitoxin or the bacterins. Inquiry made in the larger shipping centers will bear out this statement. I have interviewed men who have supervised the shipping of a great many horses in and out of California and the only time that danger is expected from shipping fever is when horses are shipped to this coast from the middle west. We have our common outbreaks of influenza but for the last seventeen years these have not been of a serious nature and respond very readily to treatment, especially the more modern and up-to-date methods of treatment.

DR. HOSKINS: Shipping fever in the East is the bane of our existence in dealing with horses in the large markets. I have lived in close proximity to a great sale center in Philadelphia for some thirty years and influenza, or shipping fever, has made up a very large part of my practice. Why, at times, in badly ventilated, badly drained and badly lighted stables, where there are continual shipments day after day, will the disease disappear for perhaps

six to eight months and then just as suddenly appear again? Some years there will not be any evidence of the disease whatever and then, when one would least expect the disease, it breaks out in the most virulent form. I have long advocated, in Pennsylvania, that we should take some steps to compel the railroads to disinfect their cars and to establish at the state line some source of inspection that would protect us from the tremendous loss and suffering. I am personally very strongly inclined to accept the theory of immediate contagion, or the immediate transmission of the disease, for I have observed hundreds of outbreaks in thirty years upon the mere introduction of a horse from the sale stable and sometimes not with any visible lesions of the disease in that horse, but I have been surprised to find outbreaks follow shortly after his admission to a large stable. I highly approve the suggestion made by Dr. Mohler that the Bureau of Animal industry should take up the matter of this disease and deal with it as it has done with the other diseases he enumerates, because the losses are extremely great in the aggregate to the shippers of mares and horses throughout the land. I do not believe there is a center in the land that sends out as much of this disease as does Chicago. I think they must gather them in from all points of the compass, in all the various forms of the disease and from there they are sent all over the country to the people of the eastern and southern states and the disease is disseminated to an extraordinary degree. That center of dissemination, it seems to me, should be very carefully guarded. I have many times found carloads of horses numbering twenty-one or twenty-two in each car, where the entire carload would show temperatures ranging from one hundred and four to one hundred and seven, waiting for admission to a sale stable in the city with the various lesions showing in one form or another, and later to find the great distribution of this disease throughout that entire stable and generally throughout the entire number of stables because there is a constant traffic in horses between dealers and there is the constant transmission of disease from one stable to another, notwithstanding the precautions taken by our great sale stables. It is high time we took some action towards encouraging Congress to give this power to the Bureau of Animal Industry.

DR. KNOWLES: I would like to ask as to the kind of vaccines to be used in the prophylactic treatment of shipping fever. Some practitioners have used the ordinary polyvalent bacterins and also the old style influenza vaccine and some use influenza serum. I think it would be well to be informed so that we would know how to differentiate in the choice of the material to be used by the practitioner in the field.

DR. HOSKINS: I have seen experiments made along these lines and watched others use every one of the various serums that have come upon the market and I have seen apparently good results in

a number of instances and I have witnessed all of them fail at times. I have religiously tried all of them, sometimes for months at a time and had quite as many unsatisfactory as I have had satisfactory results. I have come to the conclusion that the many instances where I have used them and seemed to have good results for a long period of time—a number of months—that I did not have inactive organisms to deal with. Here I ask a question, whether it is the belief of Dr. Kinsley or Dr. Mohler, if we had immediate contagion or transmission of the disease or if it was intermediate. If we have intermediate contagion or transmission of this disease in the stables which are uniformly badly drained, badly lighted and miserably ventilated, why then did we often get good results from the use of these vaccines, serums and antitoxins? But if these stables do not contain and give forth from time to time the contagious element, then they were of no value whatever and I am strongly inclined to accept this view, that it requires immediate transmission of the disease from the live animal to the other and that it does not lurk very long after the disease disappears from the stable. This is entirely in accord with what I have observed in many large stables—in stables where I have for more than thirty years dealt with this disease.

DR. TORRANCE: I would like to call your attention to an observation I made while I practiced in Winnipeg, a large horse market. The horses came chiefly from two sources; a large number were brought west from Ontario and a large number were imported from the United States, coming from Ohio, Illinois, Minnesota, and from such centers as Minneapolis and St. Paul. It being one of our regulations to require the testing with mallein of all horses coming across the American border, it was noticed by dealers and by veterinarians that the horses which had been submitted to the mallein test were not so susceptible to the shipping fever and did not have such severe attacks as those that had not been submitted to the test, indicating I think, that a considerable amount of reaction to disease in general was set up by the injection of this biological product. There is no connection, of course, between the biological cause of glanders and of shipping fever but apparently the reaction set up in this process had a somewhat retarding influence which helped to protect the animals against shipping fever.

DR. MARSHALL: I do not believe there is a disease with which practitioners have to deal that causes them more trouble than true influenza. I have not engaged in private practice for three or four years but I was engaged in that line for fifteen years previously and one of the questions which has caused me more wonderment than any, is in reference to bacteriologic products in the use or treatment of true influenza and as far as my observation has gone I agree pretty thoroughly with what Dr. Hoskins has said. I never used a biologic product in treating influenza when I thought

I could get better results by any other treatment which I have been in the habit of using. When I wished to undertake to treat a case of the bacterial form of influenza, those which gave me the most trouble were the ones that had been given the various remedies to prevent influenza. When you get a case of pneumonia and try to treat it, sometimes bacterin will help but I do not find it so. I do not know what to do, whether to give heart stimulants or heart tonics. I do not care much for bacterin myself.

I have been wondering if it is the experience of the ordinary practicing veterinarian or if any have had good results in treating these cases. I would be very glad to know about it. While we were abroad last year, we visited many of the veterinary colleges and in some of these colleges they had a great deal of trouble with influenza. They had more cases of influenza than we ever had in the state of Pennsylvania. They spoke of using salvarsan, and neo salvarsan, but the main objection to using those things was the expense. It cost about ten dollars for one dose. Of course one dose was usually sufficient but they did not feel warranted in using a dose at that price for a bad case of the bacterial form of influenza.

DR. LONGLEY: The fact is very apparent that there is something lacking in our present method of treating influenza. Since the cause, whatever it may be, has never been definitely isolated, treatment by bacterin cannot be successfully carried on to any great extent. It cannot be specific. We have found from experiments with cases in the United States that leukocytic extract has given better results than any other kind of treatment used in connection with and without bacterins or serums. It can be used in connection with the bacterins and with serums and seems to reinforce their action. In cases treated with this leukocytic extract alone, the results have been better than the treatment by any other form.

It may be possible when used in these different types of shipping fever, it may prove to be of much greater value than vaccines or antitoxins.

Referring again to Dr. Mohler's paper, it seems to be desired in treating cases of shipping fever to stimulate those body cells which will produce immunity and we claim that action for leukocytic extract. In fact, it has been definitely proven that injections of leukocytic extract will increase the number of leukocytes and stimulate the action and must of necessity result in beneficial results.

DR. ELLIS: In one of the city departments with which I am connected, we have about twenty-five hundred horses distributed in a number of stables under the care of seven different veterinarians and each veterinarian has a free hand to use his own methods. When the horses come in they are all put in a receiving stable for a certain length of time and then distributed. Whenever we get green horses soon after the distribution, we usually have this

condition to a greater or less degree in the twenty-five stables. Some of them are treated with biologic products and some are not, probably an equal number each way. In fact, I think less of them are treated without it than with it. Some are often treated with autotherapy. The chief veterinarian of our department is an advocate of that method of treatment and the results seem to be about the same in all stables.

Whenever the veterinarians get together and talk about their cases they seem to have treated about the same number and have had about the same results, so it does not seem to me there is a large difference in regard to the biologic treatment of this disease. Some are treated to immunize them and some veterinarians of the department claim that they have had more trouble acclimating horses which have been immunized than those which have not. In other words, they claim that immunization is bad, others claim it is good, so there is a difference of opinion.

DR. JENSEN: Gentlemen, I regret very much that these papers could not have been taken up yesterday, for a gentleman who is a member of the corps of British veterinarians, purchasing mules for his government at Sacramento, was here for the purpose of listening to what he could learn and if possible to tell some of his experiences. The gentleman bought mules, I presume a conservative estimate would be fifty thousand head, since last October and in such a business he, of course, has had very rich experience in handling a large number of animals.

I expect this gentleman, in particular, while very familiar with the work that has been going on at the purchasing depot at Lathrop, Missouri, has a great fund of information in reference to the value of bacterial vaccines. I believe I can speak with some authority because I have the word of a half dozen men who have used vaccines, that as a prophylactic agent they find it quite valuable but as a curative agent they have not laid much stress on it and they have a very complete record of the work that has been done.

The horses and mules bought in Kansas City were most of them immunized with bacterial vaccine. They were then re-shipped to Lathrop, Missouri, as a short trip in the country before having them shipped to New Orleans or other points for shipment across the water, so these men have in their possession reports of all horses and mules vaccinated and those not vaccinated. They also have reports from the receiving veterinarians at New Orleans giving the number of cases that took sick after arriving at New Orleans, or on the way or have been vaccinated at New Orleans as well as all animals that were not vaccinated. The reports show very conclusively that those which had been vaccinated or were treated with one of these biological products, had stood the trip much better, and even a less number became sick, although some of them got sick after vaccination, but there was a marked difference in favor of those that had been vaccinated.

I will not give you any specifics because I do not know of any but I do feel that the observation of so many hundreds of horses that have been sick ought to be worth something. I was consulted quite often by these gentlemen. They had quite a few losses and the bacterial form of the disease was very much in evidence. There is, by the way, one form of influenza that has not been emphasized. I refer to the enteric form. I do not know whether that was mentioned by Dr. Kinsley or Dr. Mohler but whenever that condition is present, the animals nearly all succumbed. Very few of them are restored.

Coming back to the bacterial form, I may say this, the treatment adopted by these gentlemen, to the exclusion of nearly everything else, is the intramuscular injection of camphorated oil and the results have been marvelous. I am very sorry Dr. Stent could not be here to tell you about it. They have adopted that treatment to the exclusion of nearly everything else.

In complicated forms where there is a ropy nasal discharge and an offensive odor, in place of injecting the camphor intramuscularly, they have been injecting it into the trachea and in various cases they combine guaiacol and creosote. They have given up the guaiacol on account of the price it has attained since the outbreak of the war. I wish to say that the information these gentlemen have given us was of such value that I think you practitioners ought to know about it and see if you cannot obtain as good results as they have.

When these cases are brought to their attention the camphor is given perhaps three times a day to begin with and later just as they need it. Nothing else has been done except to pay attention to the hygienic surroundings and the sanitation.

Speaking with the gentlemen who were at the meeting with Dr. Stent, yesterday, what do we claim for camphor? We know it is a satisfactory stimulant to the nervous system. I have used it in my practice a long time.

Camphor, besides being one of the most efficient stimulants of the nervous system, also increases leukocytic efforts.

DR. MOHLER: The use of large quantities of camphorated oil has been recommended by Dr. Farris of Germany.

DR. FROTHINGHAM: I would like to ask Dr. Marshall what the results have been from treatment by that method in Pennsylvania.

DR. MARSHALL: I am heartily in favor of camphorated oil. I believe it is one of the best treatments used. I cannot give the numbers treated, nor the statistics, but just from my general impression, it is the best treatment of the bacterial form of influenza.

DR. HOSKINS: I want to say that every graduate of the American Veterinary College who has gone out of that college during the last thirty years, has been impressed with the high value of camphor in the treatment of pneumonia, and of nux vomica and of

creosote in various forms, in all of these conditions and I believe they use it. I believe we have had uniformly good results with that course of treatment.

DR. KNOWLES: It has been my custom to use camphor in prescriptions in the treatment of influenza but I did not understand what Dr. Jensen and others had reference to in the use of camphorated oil. I would like to have Dr. Jensen detail the method of treatment with camphorated oil.

DR. JENSEN: There is an official preparation in the pharmacopoeia which I would not recommend. The question resolves itself into how much camphor you want to give and simply make a solution of sterilized oil. Then inject it into the muscle. Use an oil of light specific gravity. The heavy specific gravity oils are not so easily absorbed as the lighter. Pure olive oil is the best. Two grams of camphor dissolved in sufficient oil to make ten c.c. You can increase or decrease the dose to satisfy yourself. In fact certain German writers suggest giving more than that. It should not be put in the subcutaneous tissue but deeply in the muscle and if you are not careful, abscesses will follow. In combination with creosote we take a gram of camphor and a gram of creosote and take enough oil to make a good solution. It is the usual experience to get better results by injection directly into the trachea. It does not cause sore tissues. I frequently see reports of the use of combinations of phenol with camphor by makers of proprietary remedies.

DR. SCHULTZ: In 1907, I was in Berlin and I saw Dr. Frohman in his clinic, treating cases of shipping fever with strong camphorated oil. The camphorated oil was in a solution of one to four, or five, and steers received in twenty-four hours, 100 grams of camphor besides the oil subcutaneously. When I came to the United States I used that treatment but I did not give a gram as stated here. I never thought of giving a horse less than twenty-five grams of camphor in about one hundred and twenty-five of oil subcutaneously. I had good results and no abscesses occurred. I gave some intramuscularly but there is more danger of abscess by that method and I follow Frohman in his therapeutics. His latest book has not been translated yet but he recommends one pound of camphor in four pounds of oil. It is too strong. You cannot get the camphor in solution. I take a bottle of creosote and put camphor into that and place it in a warm place. It will dissolve in two or three days and then I simply use that saturated solution of camphor in creosote to put in my oil, but I am surprised that any one has got results from one gram.

I would give this camphorated creosote mixture about fifty c.c. taken with about one hundred and fifty of oil, maybe one or two doses a day and I have never had any bad results.

Four or five years ago when I was in Seattle, I treated a good

many cases with good results. I do not think it has any specific influence but it prevents complications. As soon as you have processes in the lung, a filling up of a part of the lung but without pharyngeal lesions, the fever varies and the patient is better one day and worse the next—that is when I give camphor and I have very good results.

DR. JENSEN: In regard to treatment and doses, if you are going to compare doses with German writers you will be very much at sea. We American veterinarians do not give as big doses as the Germans do.

Twenty-eight years ago a young gentleman came from Sweden. He located in my community and he prescribed three grain doses of eserine sulphate. I think that is too much. First of all, if you try that on an animal you will get out of the notion very hurriedly, and secondly, I do not know whether our horses would stand much of it. I think the idea is not to see how much we can give without killing but rather how little can be given and get good results and I assure you a two-gram dose of camphor has been eminently satisfactory.

DR. ELLIS: Dr. Jensen's remarks about the treatment and doses remind me of a discussion we had in our New York City meeting at one time on the use of arecolin.

Someone told us a dose of arecolin should be two or three grains. He seemed to think two grains would be the minimum dose and the most of us thought half a grain would be about a dose. In the treatment of these cases, I have used for a great many years, camphor and ether, small doses of camphor, probably fifteen grains of camphor and a gram of ether. In lung cases or with a complication of lung trouble, and in a case of pneumonic influenza, I always thought I had very good success.

There is another phase of the influenza cases that has come to my attention as frequently as the bacterial form, and that is the enteric and they did not all die by any means. When they got well they seemed to be subject to colic for quite a long while. They were very troublesome horses and in the treatment of them we found very good results by giving vaseline. We gave an ounce of vaseline by capsule probably three times a day and kept it up for two or three weeks. We have had horses convalescent and going to work which every once in a while, would get colic and we gave this treatment of vaseline for two or three days and longer.

DR. JENSEN: The enteric form I have seen come to a fatal end so rapidly that even camphor would not do any good. As to the vaseline, it undoubtedly has its merits but you do a lot better by giving liquid petrolatum.

DR. R. C. MOORE: This discussion of influenza and the statements made about the use of camphor and particularly what Dr. Ellis has said about the addition of ether, carries me back to my earlier days in Kansas City.

Along about 1896, there was a great deal of influenza in that city. The death rate was extremely heavy, so much so that the horse dealers were fearful that the disease was going to put them out of business. The line of treatment used in those days was almost entirely sedative. Aconite, acetanilid and other treatment was used to lessen the temperature.

About that time a layman who had been working in the stock yards for two or three years, made a trip to the country somewhere out in Kansas, I think, and came in contact with a clever old lady who was running a boarding house. She gave him a formula which she said would positively cure the disease. She made up this formula and sold it and that lotion nearly put the veterinarians out of business. This man afterwards sold one-fourth interest in the company which he had established for the making of this preparation, for a quarter of a million dollars. This formula probably contained camphor, sulphuric ether and raw linseed oil.

I believe the greatest results obtained from that so-called wonderful treatment, was the fact that it stopped the use of those agents that were helping to destroy life. I stopped using the sedative agents in the treatment of influenza. No matter where the temperature went, I let it alone and if I got hold of a case which had not been tampered with, I rarely had trouble.

As to camphorated oil, I have used that and I have used other agents of a mild stimulative nature and usually with good results.

DR. HOSKINS: I have witnessed the death of more animals that were treated with these magic preparations, loaded down with aconite, along about the years referred to, from 1890 up to 1900, than ever died in our neighborhood from the disease itself. In connection with the treatment that has been referred to, I wish to say that our college has advocated and has been dispensing barrels of a mixture of sweets spirits of nitre, aqua ammonia, etc. with uniformly good results.

DR. KINSLEY: In our section—the middle states—some of us are inclined to believe that shipping fever is distinct from the disease ordinarily termed influenza. Influenza, as we usually think of it, is a disease originally known as pink eye, in which there is much edema of the lungs, infected mucosa, particularly of the eye along with very marked depression and rise of temperature. We see this disease still. Possibly I may be mistaken, but we have in our section this other disease, ordinarily termed shipping fever, which is very constant in horses which go through public stock yards and it is not uncommon to find complications of the old type of influenza or pink eye and the so-called shipping fever.

Dr. Mohler has in most of his descriptions, described influenza with these complications, due to bacteria that we ordinarily associated with shipping fever. This season we have been visited with the old fashioned pink eye.

To my knowledge this disease extends in all directions from Kansas City. We have also had an abundance of the so-called catarrhal or shipping fever, which is primarily an inflammatory disturbance of the anterior respiratory tract with or without pneumonia and pleurisy. We have had an abundance of that, caused by the collection of large numbers of horses and mules there to be shipped to Europe for war purposes.

So far as the etiological factor, that I have been able to determine, is concerned, I know others have substantiated it, and in fact, I substantiated some other findings.

Dr. Hoskins asked whether or not shipping fever could be transmitted from barns that have been infected to animals that are taken into the barn. Yes, that has been observed in cases of animals which were apparently healthy. It is not possible to say positively that the animals were not infected when taken in but animals coming in from healthy quarters, taken into some of these barns, contract this so-called influenza and shipping fever. This is probably due to a filterable virus and is also transmitted from the surroundings to the animals. At least, that has been our experience in Kansas City. That is the indication. We have not absolute proof that these animals were not infected when they were led in there. They were healthy horses taken from premises where diseases of this nature did not abound and they contracted the disease.

I believe the difficulty which Dr. Hoskins and Dr. Marshall and Dr. Ellis have in the far eastern cities is due to the fact that those animals are already intensely infected when they reach those places.

A great percentage of those horses are shipped many miles so they are intensely infected when they arrive and immunization of already infected animals with active immunizing agents is not successful. On the other hand, as Dr. Jensen pointed out, if these healthy animals can be taken in their native state and immunized, I believe they can be shipped a considerable distance and through the various stock yards and that they are thoroughly well protected against so-called shipping fever, not influenza, in which the filterable virus is the cause. I believe they can be fairly well protected, but, as I stated in my paper that immunity is of relatively short duration. It is only apparently a passive immunity so far as time is concerned. It stimulates the reaction in the animal's body.

Dr. Torrance spoke in relation to mallein. I cannot quite recall the circumstances but Dr. Brown of Kansas City, has told me on different occasions, of the influence of the mallein test on these cases of shipping fever. I would like particularly to have Dr. Mohler discuss this problem, for I may be altogether wrong in the assumption that we are facing two diseases.

DR. R. C. MOORE: I would like to ask in regard to the statement as to short immunity, whether that would apply to the use of bacterins in the prevention of strangles, where it is pure strangles, rather than shipping fever.

DR. KINSLEY: My judgment is, it applies to that condition if the animals remain in their normal habitat. I believe their immunity is sufficient to guard them in a short time from either shipping fever or strangles but they are usually very susceptible to other diseases.

DR. R. C. MOORE: I have been using Dr. Kinsley's own make of bacterin in treating outbreaks of strangles on farms where there were quite large herds of horses, with very good results but I do not recall a single case where I have treated a whole herd of horses but that the disease was soon eradicated. Within as much as two years, do I recall a single case of an outbreak on those farms afterwards. Whether the immunization was due to the treatment they had received I cannot say but I asked the question to find out whether the duration of the immunity was as short in that case as it would be in the case of shipping fever.

DR. MOHLER: With reference to the question asked by Dr. Knowles, as to the best biological product to be used in connection with this disease, I am not able to answer. I consider the most important organism to be included in this product must be the various forms of streptococcus, which are found in horses infected with this disease and which should be shown to be wholly without other contaminating organisms.

In reference to Dr. Hoskins' remarks as to the immediate or intermediate transmission of virus; I think it is unquestioned that the animal itself carries more than ninety percent of the virus. In other words, a large percentage of the virus is immediate but the fact that I mentioned, the necessity of disinfection of stables and cars that are carrying the animals to eastern markets is conclusive to my mind that only a part of the infection is immediate. I think that very beneficial results are obtained by disinfection of the stables, cars, and barns, also of the National Stock Yards. The results accomplished in Kentucky by the thorough disinfection of all stock yards, stock barns, and cars which brought horses and other stock into Kentucky, would indicate that a certain portion of the virus was intermediate.

With reference to the question raised by Dr. Kinsley, as I have previously stated, the only way I could compare the diseases known as influenza or shipping fever, is to make analogy with the grippe. I believe the pink eye that Dr. Kinsley is referring to as pneumonic conjunctivitis and the associated lesion that we have in the human family of persons affected with grippe, are very similar.

The shipping fever which Dr. Kinsley refers to is merely the catarrhal form of influenza as I described it. I think we have a large number of symptoms of influenza which are known by various practitioners under different terms and while I did not mention the intestinal form of influenza, in my paper, I included that also in the etcetera.

THE OUTLOOK FOR THE CONTROL OF CATTLE ABORTION*

W. L. WILLIAMS, Ithaca, N. Y.

No adequate basis can be laid for measuring the possibilities of controlling an infectious disease until the disease itself has been clearly defined. Its geographical distribution must be known, its frequency within the involved territory determined, the character of the disease understood, and the usual time and method of transmission adequately recognized.

Contagious abortion of cattle has not been clearly defined. Many writers say that contagious abortion is present in a herd when ten to fifteen cows are observed to abort in a herd of twenty-five to forty animals. These writers seem to be very definitely of the opinion that twenty-five or thirty per cent of observed abortions in a herd of twenty-five or more cows is conclusive evidence of the presence of the contagion. If, however, in a stable of two cows, one, or fifty per cent, aborts, many of these writers would consider the abortion accidental. The attitude appears very peculiar. In other chronic contagious diseases, we consider one typical case conclusive evidence of its existence, regardless of how many other animals may be present. If we observe one typical case of glanders in a group of one hundred or one thousand horses, it is just as truly contagious glanders as if there were many cases.

Some writers admit that a distinction should be made between abortion, the disease, and abortion, the phenomenon. They admit that the infection may exist and not cause the phenomenon of abortion, but whenever they attempt to measure the intensity of the disease they use the phenomenon of abortion, the death and expulsion of the immature fetus, as the sole standard. They ignore, when they come to measure the disease, those cases where the infection exists without causing abortion, and they ignore equally all those cases of abortion which are not observed. During the first half of pregnancy, the embryo, or fetus, is so small that it may be dropped in pasture or stable without observation. As the tufts of the chorion are too small to favor incarceration, the fetal membranes are expelled with the fetus and no traces of the disaster are left in the form of retained membranes. Such abortions therefore,

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under the plan named, are excluded in the measurement. After the seventh month of pregnancy, the fetus is frequently expelled alive. This is classed as a premature birth, not as an abortion. The approximately mature fetus may be expelled dead. This is designated as a still birth.

Owing to these exclusions during the first half and the last quarter of pregnancy, most writers are led to state that abortion is most common from the fifth to the seventh months inclusive. It would be more accurate to state that, according to the narrow definition which is given of abortion, it generally occurs during this time.

Many of our foremost investigators and writers upon contagious abortion, as Bang, M'Fadyean and Stockman, Wall, and others, speaking from a pathological standpoint, define contagious abortion as an inflammation of the uterus and chorion in pregnant cows, and either directly state or indirectly intimate that the *Bacillus abortus*, which they assert causes the abortion, can live and multiply only in the gravid uterus. A series of contradictions arises. Bang found the organism inside a mummified fetus after a long duration of time, and also quotes with approval the observations of Poulsen, where, after cows had aborted and were not bred until several months later, he had avoided abortion in the succeeding year by disinfecting the uterine cavity, presumably several months after abortion.

M'Fadyean and Stockman apparently believe that the organism will remain virulent for weeks and months outside the genital tract, but will live only a few weeks within the genital tract, where it exerts its chief destruction.

In general, most writers admit that the specific pathologic lesion in connection with abortion is metritis. They largely deny that the chronic endometritis so common in sterility in cows is contagious abortion. This denial is in spite of the very clear clinical fact that cows which are temporarily sterile are exceedingly liable to abort unless, prior to conception, the uterine cavity has been thoroughly disinfected. The writers admit also that retained fetal membranes is a common complication of contagious abortion, but are unwilling to accept retained fetal membranes as one of the fundamental symptoms of the disease. They hold, directly or indirectly, that retained afterbirth accompanying parturition at full term is not contagious abortion. Clinically, and in post-mortem examinations upon the killing floors of abattoirs, we know that a

specific metritis of cows is exceedingly common. We find this identical in all macroscopic characters with the specific metritis which is present in known abortion, where the typical exudate of contagious abortion exists.

Any definition of contagious abortion yet given by our principal writers upon the subject is exceedingly contradictory and unsatisfactory. Some typical clinical observations, in conjunction with post-mortem and bacteriological study, will serve to illustrate the confusion existing in what we mean by contagious abortion.

We observed a valuable Holstein cow in the act of expelling a fetus at about the end of the eighth month of pregnancy. When labor set in and the amniotic sac had ruptured, the stall was flooded with thin, dirty fetal feces. Apparently there was between five and ten gallons of this semi-fluid substance. The fetus had suffered from scours and had distended its amniotic sac with feces. The genital passages of the dam were dilated. The fetus was alive and vigorous. It presented anteriorly and lay in the dorso-sacral position, the anterior feet and the head properly extended. The presentation and the position were normal. The expulsive powers of the mother were in abeyance. Slight traction, less than sufficient to lift the fetus, sufficed to extract it. The umbilic cord was not ruptured in extracting the fetus. The fetus was vigorous and struggled actively. We severed the umbilic cord and the fetus immediately expired. It did not breathe. An autopsy made immediately showed the alimentary tract enormously distended with fluid feces. The lungs were very dark, apparently hepatized. The spleen showed numerous hemorrhagic areas beneath its capsule identical with the appearances usually observed in an aborted fetus. The bronchii yielded pure cultures of the bacillus abortus. The dam appeared somewhat ill, though not severely so. The space between the uterus and the chorion was filled with the typical exudate of contagious abortion. She had retention of the fetal membranes, and died from acute septic metritis.

The cow did not abort, and consequently, according to the definition usually given, had not suffered from contagious abortion. She had not given birth at full term. Some would have designated this as a premature birth, but that would depend again upon what definition one would give. Unquestionably there was a fetus expelled and it was alive when expelled, but it is not clear that it was born. If we define birth as an expulsion of the fetus from the

uterus, then we might term this a premature birth, but if we define birth as the expulsion of a living fetus which continues, for at least a brief period, to live after the umbilical cord has been severed or after the connection with the uterus of the mother has ceased, or at any rate draws a single breath, then the fetus in question was not born at all, but merely expelled. We have no term for the disaster which we have described which adequately defines it. Both the dam and the fetus perished. According to the generally accepted definitions of contagious abortion, neither of them had that disease. Yet both perished and the outstanding infection recognizable in each was the *Bacillus abortus*. Many writers are very, very positive that abortion normally involves the pregnant cow only. Here, however, a fetus which was expelled alive died, and the only recognizable cause for its death was the *Bacillus abortus*. The fetus was not a pregnant cow. It was a male fetus, and so could never have become pregnant.

In two other cases, which we have recorded in our annual report for 1914-15, two calves which were born at full term or approximately so, became ill and died, one at two and one-half days and the other at four days of age. They suffered from digestive disturbances and from severe multiple arthritis. The arthritis was typical of the acute arthritis of navel infection, but extraordinary precautions had been taken to prevent navel infection. Upon post-mortem examination, each of these calves revealed the typical lesions of a fetus which has been expelled because of contagious abortion. The contents of the articular cavities yielded pure cultures of the Bang abortion organism. One of the calves might have been termed a premature birth, having been expelled at 272 days, but the other one was carried to the 286th day. At least, it must be said that they were not aborted. They were not only alive when expelled, but were fairly vigorous, and would have passed as normal at the time of birth. They remained apparently normal for one or two days. The outstanding infection in each of the calves was the *Bacillus abortus*, but, according to the writings of many of our chief investigators, calves of this age should not have contagious abortion. As they cannot be pregnant, the organisms cannot multiply in the gravid uterus. Moreover, M'Fadyean and Stockman are especially insistent that the bull plays no part in the dissemination of contagious abortion, or, if he does play a part, it is merely that of a passive carrier. These calves were both bulls. The ques-

tion is, "Did they die from contagious abortion, and if not from contagious abortion then what was the cause of death?"

Other elements have more recently entered into the question of the diagnosis of contagious abortion, without, however, having been included in the current definition of contagious abortion. It has been shown by Schroeder and Cotton and others that the *Bacillus abortus* quite commonly exists in the milk of dairy cows. It has not been stated that a cow whose milk contains this organism has contagious abortion. It would certainly not fit well in the ordinary definition of that disease.

We also recognize now, as having an interesting, if not practical relation in the diagnosis of contagious abortion, the agglutination and complement-fixation tests. When a writer attempts to define contagious abortion, however, he does not define it in such a manner as to include all animals where a reaction to one of these tests is obtainable.

Of all diseases known to veterinarians or to human practitioners, contagious abortion of cows is perhaps defined in the most ineffective and misleading terms. We have defined contagious abortion as a wide-spread chronic infection of cattle, involving, largely, but not alone, the genital organs, causing an exceedingly varied group of symptoms, amongst which there stand out prominently sterility, abortion, premature birth, and, accompanying these as a fundamental pathologic condition, metritis, with or without retained afterbirth.

We must furthermore recognize the geographical distribution of the disease and the frequency with which it occurs in the involved area before we can hope to arrive at a safe conclusion as to the possibilities of control. In most diseases, isolation, quarantine or other police measures constitutes one of the chief elements in the control. Quarantine, however, can be effective only because there are areas which are free from the disease and other areas which have the infection. In connection with contagious abortion of cattle, the views of writers and observers upon the distribution and frequency of the disease are as varied as the definition. Time and again, we read that it is uncertain when the disease became introduced into a certain country or community or herd. In other cases, very definite statements are made regarding when the infection has been introduced into a herd, and its precise date and manner have been related. Evidently if these statements were well

grounded quarantine might have prevented the introduction of the disease. If, however, we make diligent inquiry, we find that abortion exists in every country in the world regarding which we have any definite information. Wherever domestic cattle are grown and used, so far as we know, contagious abortion exacts its toll upon the breeder and dairyman, and, it does not matter what definition one gives, the toll is nevertheless exacted.

When we speak of individual herds, however, questions arise which it is difficult to answer. If we accept the current definition of contagious abortion, which we might say means approximately twenty to thirty per cent or more of observed abortions in a given year, most herds of twenty-five or more breeding females come within the definition every few years. If the definition which we have suggested be accepted, and we include as being equally important sterility, abortion, premature birth, and metritis, with or without retained afterbirth, all breeding herds are involved. If we say that a cow has contagious abortion when her milk contains the *Bacillus abortus*, so far as we know at present, each herd of any size has contagious abortion. If we turn to the other standard of measurement and accept as our basis the agglutination or complement-fixation test and we base our diagnosis upon a single test some herds will be classed as free, but if we make a persistent search by means of repeated tests, then all herds of cattle, according to our researches, are infected with contagious abortion, and by the same token, as we have stated in prior communications, essentially all cattle are infected. In one sense, however, we may recognize the introduction of abortion into a herd. The infection present may be mild and causing little loss, while the introduction of an animal having a very virulent infection may precipitate a serious disaster.

Before we can arrive at any reasonable conclusions regarding the control of the disease, we need also to learn its character, the date or epoch at which the infection occurs, and its method of transmission. The character of the infection itself is reasonably agreed upon. The *Bacillus abortus* described by Bang is almost universally recognized as the causative agent. There are a few persons who insist that the granular venereal disease, or infectious vaginitis, is the essential cause, and that this infection is distinct and unrelated to the organism described by Bang. So it occurs that in our literature some writers are very emphatic in saying that in certain regions the granular venereal disease is the cause of much abortion

and that the *Bacillus abortus* is not present, and a greater number state with decided emphasis that the *Bacillus abortus* is the cause of essentially all contagious abortion and that the granular venereal disease has nothing whatever to do with it. They are dealing, on the one hand, with a biological factor, a bacillus, and upon the other hand with a pathologic lesion. The two elements co-exist essentially universally. It has not been shown that they are identical nor that they are distinct. The apparent conflict of these two views is wholly superficial. The two views may be in conflict, and they may be identical. The most that can be said at present is that they are inseparable. Any measures which we may take to eliminate the *Bacillus abortus* will simultaneously eliminate the granular venereal disease, and vice versa. This does not indicate their identity. The date of infection and the means by which the infection is transmitted are also of great practical importance. In this respect as well as in most other phases of the problem, an accurate knowledge of the biology of the disease is of very great importance.

There is great confusion regarding the epoch and vehicle of transmission of contagious abortion. The confusion arises largely from the definitions which we have already cited. Almost all bacteriologists who have worked with contagious abortion announce the recognition in the aborted fetus of the *Bacillus abortus*. While it is not constantly present, nor even generally present perhaps, yet its recognition has been so frequently reported that the general statement needs be accepted that an aborted fetus may contain the organism within its body at the time of expulsion. It would be difficult to draw the conclusion that if a dead fetus could have in its body the *Bacillus abortus* a living fetus might not also have this organism in its organs. The calves which we have already described carry this evidence a step further. We have shown in the one case that the *Bacillus abortus* was present in the lungs of a fetus expelled alive at about eight months. Had its lungs been capable of inflation, there is no known reason why the fetus might not have lived. Had it lived, the *Bacillus abortus* was present to begin with in its organs.

In the two calves under experimental observation which we have already cited, the one dying at two and one-half and the other at four days of age, born at full term, we recognize again in the joint cavities of the calves the *Bacillus abortus*. The precautions taken in the one calf eliminated so far as was humanly possible the

danger of post-natal infection, and according to the evidence attained it must be concluded that the calf was born with the *Bacillus abortus* existing in its system. In the other calf, which lived four days, and was fed upon raw milk, the infection may have been obtained through the milk, but was probably pre-natal.

Proceeding a step further, numerous investigators have shown that the *Bacillus abortus* is a common contamination of the milk of dairy cows. It has also been clearly shown that the discharges from the genital tract of a cow immediately after parturition more or less generally contain the *Bacillus abortus*, especially when the cow has aborted. Cows which have aborted are frequently used as nurses for calves from other cows in order to save the milk, which it is not desired to place on the market, or the milk from such aborters is fed to calves, either alone or mixed with the milk of other cows. This is especially true when there is retained fetal membranes with a repulsive discharge which renders it undesirable to place the milk upon the market, where dairy inspection prevails.

According to the definition which we have given on contagious abortion, practically all cows which have metritis have contagious abortion. In our definition of metritis we include, as most writers do not, the scarlet-gray and other discharges which are very commonly observed after parturition and are designated as lochia. These emanations from the genital tract do not occur in a typically sound animal. Whether these discharges be scant or voluminous, the constant tendency is for them to ooze down along the tail, thighs and udder and contaminate the exterior of the teats, so that the calf in sucking the cow or a milker in drawing the milk for the calf inevitably gets some infection into the milk. We have thus two sources of milk contamination with the *Bacillus abortus*;

- (1) The milk within the udder may be contaminated, probably originally through the teat canal from the discharges coming from the genital tract, and,

- (2) The milk is contaminated by the *Bacillus abortus* from the exterior of the teat and udder.

The calf, in feeding upon such milk, inevitably ingests the infection. According to our investigations in herds where abortion prevails, the blood of fully ninety per cent of the calves grown upon raw milk reacts to the agglutination and complement-fixation tests for contagious abortion. Furthermore, according to our studies, the infection persists. It becomes somewhat dormant in

many calves after they pass approximately the one hundredth day, and are placed largely upon vegetable foods, and is aroused again at the time of copulation. The reaction then remains high until the pregnancy terminates. In such cases, according to our observations, if the blood reaction in young heifer calves is high, the rate of abortion in the first pregnancy of the grown heifer is correspondingly high. This epoch of invasion has not yet been accepted as of importance by veterinarians and breeders. The evidence at present, however, points with very great emphasis to this epoch as the most highly important in the course of the spread of the disease.

A second epoch of dissemination, which has been largely discussed, is that of the first pregnancy. M'Fadyean and Stockman especially, along with numerous other writers, believe that the frequency of abortion in first pregnancy is due to the ingestion of contaminated food. They do not say how or when it has become contaminated, but they apparently believe that the herbage which the pregnant heifer eats has in some way become contaminated with the *Bacillus abortus*, and, taken into the digestive tract, passes to the uterus and sets up pathologic processes which eventually bring about abortion. Our experiments upon this point have been exceedingly scant, but so far as our studies have been carried it has appeared that heifers in first pregnancy offer a distinct immunity toward infection through the alimentary tract and the disastrous infection must be referred back to contaminated milk instead of to contaminated herbage.

The conflict between these two epochs of infection is superficial. Essentially, they are the same, the infection through the alimentary tract. There are certain important differences in the data. In the case of infection by the ingestion of milk, we have the clear and indisputable evidence that the milk is commonly contaminated. We do not, however, possess any material evidence to show the contamination of herbage which the heifer in first pregnancy may eat.

Another means of transmission of the disease which has been vigorously asserted, and equally vigorously denied, is the contamination by copulation. The belief here is exceedingly varied. Some believe that the bull is capable of direct transmission of the disease, that is, that he himself is infected and that the seminal emissions bear the infection. Others claim that the bull may merely be a passive carrier of the disease and not at all actively concerned

in it. Yet others believe that contamination by the bull is of no consequence whatever and may be completely ignored. In our studies, where we have tested the blood of bulls by the agglutination and complement-fixation tests, the blood of each breeding bull has ultimately reacted. We may make one or two negative tests, but if the case is persistently followed ultimately the blood reacts. If we accept this as a definition of contagious abortion, then the bull must have the disease, and just why he should not transmit it, it would be exceedingly difficult to state. If we resort to the blood tests upon bull calves, we find in herds where abortion is rampant, that the blood of most of these reacts at a period between twenty and one hundred days of age, and we have no evidence to show that the infection is ever completely eliminated, though we have excellent evidence that it becomes somewhat dormant during the period beginning with the placing of the calf largely upon herbaceous food and that it is aroused at the beginning of his use for breeding purposes.

Those who claim that the bull is a negligible factor in the dissemination of contagious abortion must ignore much clinical evidence of very great importance. In a large herd where we have excellent data, two hundred cows were purchased from small herds in Canada and imported to the state of New York. Naturally, many of these were pregnant, and many were not. During the first nine months, that is, during the time in which the pregnancies which existed at the time of purchase were normally to terminate, the abortion rate in this group of cows was less than four per cent. Those which were not pregnant were bred to sires which had been in use upon the farm, where abortion had long been severe. When pregnancy began to terminate in these, the abortion rate rose to twenty-six per cent, or approximately eight times as great as it was in the cows which had been bred in Canada.

On the same farm abortion had long been severe during first pregnancies, the average having been about fifty per cent. A change was made in the plan of feeding the newborn calves. When these grew and became pregnant for the first time, the abortion rate dropped to nine per cent. They were bred to young bulls which had not been used previously for service, or at least to no great extent, and were presumably healthy. Just at present some of these heifers which carried their calves so well during first pregnancy are aborting very heavily in their second pregnancy. Their sec-

ond breeding was to older herd bulls which had been used extensively upon cows which had aborted or been sterile or had metritis, with or without retained afterbirth.

Other evidence equally suggestive might be brought forward. It appears to us that this evidence is too important to be ignored, and that we must conclude that the bull plays a very essential part in the dissemination of the disease. In other words, we are opposed to the hypothesis of an infectious disease which confines its ravages to one sex and in which the contamination must always occur between individuals of the same sex. Neither can we well conceive of a disease which can be transmitted only at a certain period in the life of the individual. It is in conflict with our knowledge of other transmissible diseases.

Another method of transmission of the infection, which has been the chief one in the popular mind throughout the history of the consideration of this disease, is the infection by co-habitation. It has been long believed and emphatically asserted that if a cow aborts and is permitted to remain in a stable with other pregnant cows, if it is really contagious abortion, a large proportion of the other cows in the stable will quite certainly abort. The evidence upon this point is clinical and is exceedingly inaccurate. If in a given herd a cow aborts and then a short time thereafter numerous other cows abort, the evidence is considered conclusive by the veterinarian and breeder that the first animal aborting had contagious abortion and that the succeeding abortions were a direct consequence of the first abortion.

If, on the other hand, a cow or heifer aborts in a stable among other pregnant animals, and few or no abortions follow, it is then decided that the animal which aborted did so accidentally. It is then recalled that the cow which aborted had slipped or had been gored (at least, the dairyman remembers having seen some animal gored before the one aborted, and, while he has kept no definite account, it fits very well with the animal which has aborted), or some other accident has been invoked to account for the abortion. Slips, gores, and other accidents are so universal in cows and other animals that they can always be used as explanations for the occurrence of abortion. In attributing these cases to accidental abortion, the interesting fact that no case of accidental abortion has ever been verified by post-mortem examination is ignored. If it were admitted that a solitary abortion might just as well be con-

tagious as accidental and that repeated abortions might just as well be accidental as solitary abortions and that we have no proof that accidental abortion has ever occurred in any cow, it would probably clear to a great extent one of our misconceptions, and would leave us in a better position to judge of the importance of cohabitation in the spread of contagious abortion. In our experiment herd we find that if a pregnant animal is sound she may run with other animals which abort, she may slip, she may be gored, she may be fed experimentally upon abortion bacilli, but she does not abort. On the other hand, we observe that in many herds aborters are habitually isolated, and it is interesting to observe that abortion is most frequent and persistent in those large herds where there are great numbers of heifers in first pregnancy and where for years it has been the custom of the management to isolate aborters from the rest of the herd. Paradoxical as it may seem, it would be safe to say that, in those herds where the greatest care has been taken to separate aborters immediately from the remainder of the herd, abortion is most prevalent and severe. It is not because the aborters have been separated, but because the infection of abortion is so severe in those herds that the management is fully convinced of its contagious character, and then undertakes to control the infection in a manner wholly out of harmony with the character of the infection and having no relation, so far as we can observe, to the actual method of transmission.

We have contended for years that if the uterus is clean at the time of conception and if this clean uterine cavity becomes sealed, which requires a period of less than thirty days, it is almost if not wholly impossible to disturb the course of pregnancy by means of infection. Apparently there is conflicting evidence upon this point, and much has been made of that apparent conflict.

In other contributions, Dr. Moore and the writer have recorded certain experimental attempts in the production of contagious abortion. Dr. Moore injected into the jugular veins of five cows pure cultures of the *Bacillus abortus*, and all five animals aborted. The writer at about the same time injected equally large doses of essentially identical cultures into six heifers of about one-half the size of the cows used in Dr. Moore's experiment. None of the six heifers aborted. In one, which was killed, the typical exudate of contagious abortion existed in the uterus and gave pure cultures of the *Bacillus abortus*. Many look upon this and similar results

as being in serious conflict. They were not in conflict at all. The five cows in Dr. Moore's experiment were from a herd where abortion had raged the previous year. Two of them had aborted in the previous year, two of them had been sterile or had aborted unseen, and only one had calved, and with her it was not known that she did not have metritis or other definite symptom of contagious abortion. The infection, it might be argued, was present in the uterus at the time of conception from the prior abortion, so that they might very well abort. In the heifers there was no good reason to believe that they were already infected.

Another element entered into the question. The five cows in Dr. Moore's experiment were bred to the herd bull in the badly infected herd. Our six heifers were bred to an experiment bull which had not been previously used for service and which was supposed to be clean. Some veterinarians apparently believe that there was a further conflict in the results obtained. Some would think the results in Dr. Moore's cases proved very clearly that the abortions were the direct result of the infection injected into the jugular vein. We stated that we did not believe that the abortions were due directly to this artificial infection. Even if one asserts that in the five animals experimented upon by Dr. Moore the abortion was due to the injection, and we assert that it was not, the conflict was apparent rather than real. It is a general law of infectious diseases that the damage done by the infection at a given point is more or less dependent upon the degree of general infection. It might very well have been therefore that if the five cows inoculated by Dr. Moore had not received these pure cultures in the jugular they would not have aborted, but that does not at all mean that the abortion was the direct outcome of the intravenous injection. It is perfectly reasonable to assume, and we believe that one must admit, that if the infection of contagious abortion existed in the uterine cavities of these five cows, the addition of a large volume of the *Bacillus abortus* to the blood stream would depress the general system and give free rein to the organism already existing in the uterine cavity, precipitating disaster. Accordingly, many of the apparent conflicts in our data upon contagious abortion are apparent only, and possess no important significance.

Conclusive evidence that cattle abortion can be readily transmitted by co-habitation and that it will rapidly induce abortion in pregnant animals is wanting.

In considering the outlook for the control of contagious abortion in cattle, we must have regard for all the foregoing questions. Many of them cannot at present be answered. None of them can be answered so fully and authentically as we may wish. Enough is known, however, to warrant certain important conclusions which have a bearing upon the question of control.

While admitting that a calf may be born with the infection of contagious abortion in its system, may live and be more or less vigorous and thrifty, according to our investigations, the majority of calves are born free from this infection, but in a large proportion of cases they acquire the infection with the milk. In large herds where abortion becomes static, the infection of the young calves through the milk, as measured by agglutination and complement-fixation, is very severe. In some calves, perhaps far more than we recognize, the abortion infection is so severe that it plays an important part in the mortality of young calves.

When ready to accept this fundamental source of danger, the control of the infection is at hand. We can eliminate a large part of the infection by taking the calf away from the cow at once when expelled and then carefully washing and disinfecting the cow's udder before milk is drawn upon which the calf is to be fed. We may add to this repression of the infection by proper care in the disinfection of the hands of the milker, in the sterilization of the calf's feed pail and in the discarding of the first milk from the teats. We may go further. We may take the milk for each and every calf from a cow which has calved normally and has cleaned promptly. In our investigations recorded in our annual report for 1914-15, we have shown that the tendency of the blood of a cow to react to the agglutination or complement-fixation tests runs parallel to the duration of parturition. If the expulsion of the fetus and fetal membranes requires but two or three hours and no discharge from the genital tract follows, the blood of the cow will not probably react and the blood of the calf fed upon her milk will almost certainly be negative. On the other hand, if the parturition is tardy, and the afterbirth is retained, the blood of the cow will almost certainly react, and if the calf is permitted to take the raw milk, its blood will almost certainly react by the time it is twenty days old.

It appears therefore that we can add increased security for the calf by selecting the cow from which the milk may be taken,

based upon clinical observation upon the duration of parturition.

In our experiment animals and in some other experiments, we have studied the effect of boiled milk. In our own experiment herd, where the degree of infection in most individuals is slight or negative, our calves live well upon boiled milk, and their blood does not react. When we go into other herds, however, and attempt to feed calves upon boiled milk where parturition has been tardy and where the afterbirth has been retained, the calves very largely succumb to disease during the first few days. If, however, such a calf is started upon raw milk, even though it may be suspicious, and the precautions as to cleanliness above suggested are taken, the tendency to infection in the calf is less marked. The calf is more vigorous and healthy, and in time, according to the clinical observations, it tends to throw off and annul the comparatively small amount of infection which it has received. When the calf has reached eight to ten days of age, the infection may be further repressed by feeding the calf upon sterilized milk, which at this age it bears with impunity. There is consequently a seemingly fair prospect for the control of the abortion infection in young calves. It is not as yet practicable to eliminate the infection, but by the proper selection of milk and care in feeding we may keep the infection to a low volume and virility and guard the well-being of the calf.

A second point where efficient repression of contagious abortion may well be hoped for is with reference to animals which have recently suffered from the infection of contagious abortion in the genital tract, producing either sterility, abortion, premature birth, or, these failing, metritis, with or without retained afterbirth. Clinical evidence is now very abundant and clear that in cases which have not been at all pregnant or in which the pregnancy has not been recognized but has terminated in abortion without observation, as well as in those cases where definite disease of the uterus has been clearly observed, we may by thorough disinfection of the uterus, not only tend definitely to favor conception, but, when conception has occurred, tend decidedly to insure the pregnancy against disaster of any kind. This seems to be so thoroughly shown that it should no longer admit of reasonable doubt.

A third opening for efficient repression is with the breeding bull. We have no means at present for eradicating the infection from either sex. As in the female, however, so in the male, we may

accomplish certain results, which seem to favor repression of the losses. We may cleanse and disinfect in a reasonable degree the sheath and prepuce of the bull. In accordance with this, we have for some years recommended the regular douching of the sheaths of breeding bulls. Admittedly it does not reach far enough, it cannot go beyond the sheath and prepuce, but it seems to be valuable, however imperfect. If we really desire that a bull shall be free from the disease, according to the evidence which is now at hand, we must go back to the date of birth and either guard the bull calf against infection or so limit the infection that it will interfere in the least possible degree with his efficiency as a breeding sire when breeding age shall have been reached. This much having been accomplished, we can guard him with some degree of efficiency in so far as having him become contaminated from copulating with diseased cows is concerned. In order to do this, however, we must treat all cows as suspicious, and make our hygienic rules universal in application. We must disinfect the sheath of the bull each time that he is used for breeding purposes.

Our data are reasonably clear upon one other important point. In large herds where abortion is severe and much sterility exists, the bulls are heavily used. A cow which requires ten or fifteen copulations for conception is a greater strain upon the herd bull than ten cows which breed at first service. Owing to the infection which is present in the genital organs of the cow, she not only requires a greater number of services, but each service constitutes a distinct menace to the hygienic condition of the bull. Whenever the work of the bull is greatly increased through repeated copulations, any infection having any venereal character is enormously increased in virulence, according to the general rule applying to venereal diseases. Consequently, if a bull has acquired in a moderate degree the infection of contagious abortion, but not sufficient to constitute any serious menace to his breeding power, the infection may be enormously stimulated and its power for evil indefinitely multiplied by repeated copulation. This danger is further heightened by close confinement and high feeding, which tend constantly to reduce the vigor of the animal and to lessen the resistance to an infection present in his system.

From our viewpoint, believing that the chief sources of infection consists of the milk fed to the newborn calf and of copulation, we consider that the outlook for the control of the disease

is hopeful. The hope for the control of the disease is dependent, however, upon our acceptance of the belief, which is substantiated by so much evidence, that the infection is essentially universal and that the milk of no cow may be safely accepted as being wholly free from contamination with the abortion bacillus. Unless we accept this hypothesis it is vain to expect breeders to go back to the newborn calf to institute measures against future disaster.

This proposal is not without interest in connection with other subjects of very great importance. The ideals which we have suggested for the growing of calves would eliminate other dangers which are of great significance in the problem of cattle growing. There is much agitation throughout our country with reference to the feeding of skim milk and whey from creameries and cheese factories. The agitation has been largely predicated upon the danger from tuberculosis, but the evidence points now so clearly toward raw milk as laying the foundation for great losses in breeding efficiency that it gives the question added importance. When a breeder or dairyman goes to a creamery or cheese factory and carries away with him, to feed his calves, skim milk and whey which have not been sterilized, he carries with him not only great danger from tuberculosis, but he certainly carries, according to the present state of our knowledge, the most virulent infection of contagious abortion which the milk of the neighborhood affords. If the infection in his own herd is not of the highest type of virulence, he then buys in these raw dairy products the most virulent strains of these abortion bacilli which the community affords. In this way the breeder constantly exposes his calves, not to one infection, but to several.

We consider it hopeless to attempt to control abortion and other chronic diseases if the system of the newborn calf is thoroughly saturated with all the various infections which may be transmitted in milk or in other food. If we are to have healthy herds, the foundation for such health is in the growing of healthy calves, and after these have been grown the guarding of their health is a far more simple matter. If we have grown healthy heifers and healthy bulls with which we may mate them, it would appear very hopeful indeed that we may thus have a healthy herd of high breeding efficiency. Attaining this, we might very well close with quarantine regulations by which we would exclude contaminated animals from

entering the clean herd, instead of attempting to control the disease, as has been done for generations, by preventing animals infected with contagious abortion from entering herds also affected with contagious abortion.

It is objected here that it is impolitic to treat the problem openly as a practically universal infection. It is suggested that breeders and dairymen will not accept such a view and that consequently we cannot have measures applied based upon an essentially universal infection, and that hence we can accomplish nothing in its control. The objection is well founded. We do not expect to convince at present any large proportion of breeders or dairymen of the practically universal distribution of the infection of contagious abortion. Veterinarians themselves almost universally teach otherwise, and breeders and dairymen have been taught otherwise for generations. If we look at the other side of the question, however, and attempt to handle contagious abortion as a somewhat rare infection or as being rather common and yet not nearly universal, only a minority of herds really having the infection, the question arises, "How much good will we do?" If we say that where a cow expels a dead fetus at 260 days it is abortion and where, because of a specific metritis, she expels a live fetus at 270 days and it continues to live, it is not abortion, then take the cow which admittedly has abortion out of the herd and leave in the herd the other one which has suffered from the specific metritis caused by the *Bacillus abortus* and has retained her placenta, we certainly shall not control or repress contagious abortion. If a pregnant cow suffers from the specific metritis of contagious abortion, but resists the disease to such an extent that she finally gives birth to a living and apparently healthy calf at full term and retention of the afterbirth accompanies the metritis, there ensues a very great and virulent discharge from the genital tract. The cow has not aborted, and consequently she is not removed from the herd. Surely such a plan cannot control contagious abortion. If we trace the ramifications of the infection throughout, the same general considerations apply. We cannot control the disease by isolation of aborters. It has been tried for several generations, and has failed. It is failing now, and must always fail.

Owing to the general belief that contagious abortion is an acute rather than a chronic infection, various expedients are in-

voked to control the disease, which, being out of harmony with the actual character of the disease, necessarily fail. Believing in the transmission of disease by co-habitation, much has been said regarding the disinfection of the gutter and of the posterior parts of the cow. These may and do have a distinct hygienic value, and should be used, but when we rely upon these for the control or repression of contagious abortion our hopes are upon a false basis.

Others, believing that in some peculiar manner the abortion is due directly to an infection in the blood stream instead of to a local pathologic condition in the uterine cavity, though associated with or dependent upon an infection in the blood stream, have attempted to control the disease by introducing into the blood through one avenue or another various antiseptics. For several generations the use of carbolic acid has been advised, but the fact that carbolic acid is not universally used and that contagious abortion is on the increase is very good evidence that it has not proven highly efficient. More recently, methylene blue has been urged as a panacea. While millions of dollars are being expended annually, the makers of the drug have unquestionably profited as greatly as the users. There is no evidence that the methylene blue enters the sealed utero-chorionic space, where the specific metritis of contagious abortion is exerting its malign influence.

Another group of observers has brought forward the use of vaccines or bacterins with a view to producing immunity. One of the principal reasons why abortion exists so prominently today is that the disease itself does not produce any immunity, and the most definite reason why almost every breeder in the country does not purchase at great expense the abortion bacterins which have been so loudly advertised is that they have failed to produce immunity in this chronic infection. Sometime the production of immunity may succeed.

A new species of fossil horse has been discovered by Dr. Mark Francis of the State College of Texas. The remains were found imbedded in a layer of sand and small gravel at a depth of 25 feet while a well was being dug. In honor of its discoverer the name *Equus francisci* has been applied.—*From the Veterinary Alumni Quarterly, Ohio State University.*

STUDIES ON THE TRANSMISSION AND PREVENTION OF CESTODE INFECTION IN CHICKENS

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INTRODUCTION. The problem of tapeworm infection in chickens has received but little attention in the United States. In fact it was entirely untouched until a few years ago when the subject was opened by Stiles (1896) and work was begun by Ransom (1900, 1902, 1904, 1909) on poultry and other birds. At the present time less than a dozen references constitutes the entire American literature on the subject. Five species of cestodes are known to infest chickens in various parts of the United States.

No work has been done on the life history of the forms existing in this country. However, studies have been carried on extensively with poultry cestodes in various other parts of the world, though as yet very little has been finally determined. In only one species of chicken cestode has the life cycle been demonstrated experimentally. That is *Davainea proglottina* (Davaïne) for which Grassi and Rovelli (1889: 372; 1892: 30, 85) have shown that the intermediate host is a slug (*Limax cinereus*). This species of cestode has not as yet been reported in this country.

Chickens are supposed to become infested with another species through eating snails, a third through eating flies, and a fourth through eating earthworms. Piana (1881-1882) found in a snail (*Helix*) two cysticercoïds which agree closely with the head of *Davainea tetragona* (Molin). No experiments were performed to demonstrate that the cysticercoïd was the larval stage of that species and the only evidence of their connection is the similarity in form. Grassi and Rovelli (1892: 33, 87) found in flies cysticercoïds which closely resembled *Choanotaenia infundibuliformis* and base their conclusion of identity on the structural similarity.

Grassi and Rovelli (1889: 372; 1892: 29) found in earthworms (*Allolobophora foetida*) cysticercoïds which they associated with the scolex of *Dicranotaenia sphenoides*, a chicken cestode not reported in this country. Here again the only evidence for regarding it to be the larval stage of this species is a general structural likeness. In no one of these three forms was the life cycle demonstrated experimentally. Such comparisons are not proof that the cysticercoïds are intermediate stages of definite species, but only give a clue as to the probable life cycle.

In other kinds of poultry more has been done on the life histories of their cestodes. The life cycles of five species of duck cestodes have been demonstrated through experiment. Schmidt (1894) proved that *Drepanidotaenia anatina* (Krabbe) has its intermediate stage in a fresh-water crustacean (*Cypris ovata*). He fed large quantities of tapeworm eggs to the crustaceans and found that the larvae developed in two weeks during the summer. Rosseter (1891, 1892) has shown that a second duck cestode, *Echinocotylus Rosseteri* (Blanchard), has its intermediate stage in another small fresh-water crustacean (*Cypris cinereus*). He fed large numbers of the crustaceans to ducks which upon examination later yielded a large crop of tapeworms of the species named.

Rosseter (1897) also demonstrated experimentally the life histories of three other species of duck cestodes. He had discovered some cysticerci in crustaceans which he compared with the adult worms occurring in ducks and found that they agreed closely. He produced *Dicranotaenia coronula* in a duck by feeding it *Cypris cinerea*. *Drepanidotaenia gracilis* was introduced into the ducks through *Cypris cinerea* and *Cypris viriens*. *Drepanidotaenia tenuirostris* was likewise raised by feeding *Cyclops agilis*.

As in other cases the question of control of infection in chickens depends to a great extent upon the life history of the parasites. Little can be done to wipe out the disease until more is known of its source. Certain methods may be employed to check it, but as yet it has been impossible to prove the exact source of infection. Usually it is easiest to control such forms during the developmental stages.

This paper is the result of some investigations carried on to find out the life history of certain chicken tapeworms. Numerous experiments were tried on various insects and many observations made on the habits of the birds in the endeavor to ascertain where the cause of the infection was located. The habits of the birds are probably the chief factors to be dealt with in experiments of this kind. Certain insects that are common about the habitats of the birds are readily eaten. They are hence more likely to be intermediate hosts than those which are rare in these localities. Such factors have been taken into consideration and through experiment it has been shown that one cestode, *Choanotaenia infundibuliformis*, has its intermediate stage in the common house-fly.

The most of the material was collected, and the experimental

work was done on a farm at Hardy, Nebraska. A large amount of material was also collected at the poultry farm at the University of Illinois.

Thanks are due to Professor D. O. Barto, of the University of Illinois, for giving me the privilege of collecting material at the poultry farm. For other assistance I am indebted to my father and mother, William and Flora Gutberlet, for their untiring efforts to make this work a success by taking records and making collections of material at times of the year when they would not otherwise have been taken.

I wish to express my appreciation to Dr. Henry B. Ward, at whose suggestion this work was first taken up, for his helpful suggestions and criticisms during the preparation of this paper.

METHODS OF TECHNIC. In making collections of tapeworms the intestine of the bird was slit open under water and the contents removed by shaking gently. The worms are usually attached to the wall and can be easily seen and removed with the aid of a pair of needles. Those that are not attached sink to the bottom of the dish.

In removing the worms from the intestine it was found best to transfer them directly to fresh water. A weak saline solution was demonstrated to be harmful as the worms die in it in a very short time. Tower (1900: 362) found saline solution harmful to cattle cestodes (*Monezia*). In fresh water, the worms soon become well extended and remain alive and normal for twelve to fifteen hours, or even longer. The worms are best killed in a corrosive-acetic solution and preserved in 70% alcohol and glycerine. For study of structure and accurate diagnosis of species the worms were cut in sections from 5 to 10 microns in thickness, stained in Delafield's or Ehrlich's acid haematoxylin and destained in acid alcohol.

In order to use house-flies for experimental purposes one has to work out first, methods of keeping them alive. The flies used were kept for experiment in small cages. They demanded a great deal of attention because the slightest disturbance of conditions was harmful. They were fed most satisfactorily on blood, liver, and spleen. It was found that a fly could not live long without a constant supply of water in the cages. The cages had also to be placed in the sun for a few minutes each morning, and then kept in the shade for the rest of the day, but not in a cool place,

At the conclusion of the experiment the flies were killed, fixed in corrosive-acetic solution and preserved in 70% alcohol. The chitin covering of the body of the flies was punctured to allow these fluids to penetrate properly.

Large bottles proved very satisfactory as cages for beetles during the experiments. The bottles were fitted with glass or metal stoppers provided with pores for the passage of air. Leaves and a small amount of soil were placed in the bottom of the bottle. The beetles were killed and preserved like the flies, but before sectioning the chitin covering was removed by dissection.

AMOUNT OF INFECTION. The flock of chickens upon which these studies were carried on was so heavily infected with the tapeworm disease during certain seasons that it was rather unusual to find a bird that did not harbor at least a few of the parasites. The investigations extended over a period of two summers. Close observations were made during those seasons, and also at several other times during the year, to secure a record of the amount of infection during other seasons than the summer months.

The first summer (1912) about fifty chickens were examined for parasites. Eight of these were adults and in no case was there any infection. Ten young birds from six weeks to two months old were examined in June, but none of them were infected. The first infection of tapeworms for that year was detected on July 25. Between that date and September 9, thirty-two young birds were examined and every one showed some infection. In some it was slight, while in others it was very heavy. During this same period, between July 25 and September 9, some adult birds were examined but yielded no parasites.

During the summer of 1913 forty birds were examined between August 10 and September 18, with some infection in every bird. A few of these were adult birds which had only a few parasites. The young birds were more heavily infected, although the number of parasites varied with different birds. In one bird which was examined at the age of seven weeks, twenty-five tapeworms were found. Between June 17 and August 1, eight birds were examined and cestodes were present in every bird with the exception of one adult killed on June 24.

I have records of infection in the flock for January 1 and April 27, 1913, and for November 20, December 2, and December 26, 1913. There are five species of worms infesting the chickens in this place and further details are given in the table,

Between June 20 and August 1, 1913, examinations were made of about fifteen birds at Urbana, Ill. Some of these were from the poultry farm at the University of Illinois and others were from private yards of residents in this vicinity; in only one bird was there any trace of an infection. In that case there were a few fragments of worms which were in such a state of disintegration that they could not be preserved or determined. No further examinations for parasites were made in this locality until December 2, 1913, when it was discovered that the chickens at the poultry farm at the University of Illinois were badly infested. Several were examined and found to harbor *Davainea echinobothrida*, *Davainea cesticillus*, and *Hymenolepsis carioca*.

A general examination was made of the living birds at the poultry farm and it was discovered that symptoms of cestode disease were manifested by the great majority of the chickens, although the infection was apparently not heavy except in a small percentage of the flock.

In making examinations upon dead birds infested with *Davainea echinobothrida* it was found that large nodules were formed in the intestinal wall which is a characteristic pathologic effect of this particular spiny-suckered form. *Davainea cesticillus* seems to be almost universally present as there was hardly an infested bird examined in Nebraska or Illinois that did not harbor some of this species.

The following table shows the amount of infection and the number of worms occurring in each bird examined, both in Nebraska and Illinois:

DATE	LOCALITY	Age of host	No. of <i>D. cesticillus</i>	No. of <i>D. tetragona</i>	No. of <i>D. echinobothrida</i>	No. of <i>Hymeno. carioca</i>	No. of <i>Ch. infundibuliformis</i>
July 25, 1912	Hardy, Neb.	4 mo.	5				
" 29	"	4 mo.	2	8			
August 2	"	5 mo.	3				
" 7	"	5 mo.	3	15		20	2
" 8	"	5 mo.	10	25		10	
" 9	"	5 mo.	10	35			
" 10	"	5 mo.	5	15		5	2
" 11	"	5 mo.	7	10		3	
" 12	"	5 mo.	10	10		30	3
" 15	"	5 mo.	5	4			1
" 20	"	Adult					
" 20	"	5 mo.	3	15		3	1
" 21	"	5 mo.	15	10			
" 21	"	5 mo.	3	2			2
" 22	"	5 mo.	3	8			3

DATE	LOCALITY	Age of Host	No. of D. cestillus	No. of D. tetragona	No. of D. echinobothrida	No. of Hymenocarioca	No. of Ch. infundibuliformis
" 23	"	5 mo.	3	3		2	2
" 25	"	5 mo.	5	10		10	
" 27	"	5 mo.	6	4			5
" 29	"	Adult					
September 2	"	Adult					
" 4	"	6 mo.	5	20		10	
" 6	"	6 mo.	15	10			6
" 7	Hardy	6 mo.	10	14			5
" 8	"	6 mo.	4	10			2
" 9	"	6 mo.	10	10		5	
January 2, 1913	"	Adult	3				5
March 23	"	Adult					
" 25	"	Adult					
" 30	"	Adult					
April 27	"	Adult	10				
June 17	"	Adult					
" 24	"	Adult					
" 21	Urbana	2 yr.					
" 23	"	2 yr.					
" 28	"	2 yr.					
July 7, 17, 20	Hardy	4 mo.	infection, but records incomplete.				
August 10	"	4 mo.	5	10			15
" 11	"	4 mo.	3				
" 15	"	4 mo.					3
" 16	"	5 mo.	15	30		20	10
" 17	"	5 mo.	25	30		5	8
" 19	"	5 mo.	6	15			5
" 20	"	5 mo.	6	6			
" 26	"	5 mo.		15	2		
" 26	"	5 mo.	20	25	8		10
" 27	"	5 mo.	1	5	4		
" 28	"	5 mo.	2	10		10	5
" 28	"	5 mo.	10	10			6
" 30	Hardy	5 mo.	8	18			3
September 2	"	Adult	3	12			4
" 4	"	5 mo.	20	20			
" 6	"	7 wks.	17				8
" 10	"	5 mo.	8			10	5
" 10	"	5 mo.	15	25			4
" 11	"	5 mo.	10	15			4
" 12	"	5 mo.	25	35			15
" 13	"	5 mo.	8	10	4		8
" 15	"	6 mo.	10	10			5
" 16	"	6 mo.	3	30			
" 17	"	6 mo.	20	10			
" 20	"	8 mo.	35	6			10
December 2	Urbana	4 mo.	20		30		
" 5	"	4 mo.			3		
" 6	"	Adult	5			5	
" 9	"	6 mo.	6			6	
" 24	Knoxville, Ill	Adult	17	00	00	00	1
" 26	Hardy	Adult	1	11			3
January 1, 1914	"	Adult	3	2			5

SYMPTOMS AND EFFECTS OF TAPEWORM INFECTION. A great deal has been written on the symptoms of this disease by various authors, but in every case they were unable to reach any definite conclusions on the subject. In my own study, which was extensive, I reached the following definite conclusions: The symptoms, while not really individual, vary to some extent with the different birds, with the age of the birds, and with the degree of infection. Some birds are affected by the disease much more than others and show symptoms and effects much more readily. Some birds that show no symptoms and appear in good health are heavily infested with the worms, while others showing severe effects and manifesting all the symptoms are not nearly as heavily infested. The age of the host is a factor of much importance for indicating the presence of an infection with the species I studied. Young, growing birds are affected much more than adults and show the symptoms more distinctly. Even a comparatively slight infection can be detected in a young bird a few weeks of age, while a heavy infection is very marked. Most adults manifest no external symptoms as far as appearance is concerned unless they are heavily infested. The degree of infection is another factor which is of importance in making a diagnosis for cestodes. Birds that harbor only a few worms show conditions which are quite different from those that possess a large number. Therefore the symptoms are rather variable.

Stiles (1896: 13) mentions some general principles for diagnosis, and Zurn (1882: 17) gives more fully some of the symptoms that may be taken as indications of the disease in the birds.

In general, one may say that a light infection can hardly be noticed and is apparently in no way harmful to the fowl. In cases suffering from a moderate to a heavy infection the conditions were found to be quite different. In the first place, birds that are moderately infested are apparently always hungry, having indeed ravenous appetites and seeming never to be able to get enough to eat. Secondly, they manifest a great desire for water, increasing in cases where the infection is heavy. Moreover, infected birds are greedy and it seems as if their hunger had caused them to lose control of themselves whenever there is a chance to obtain any food. Such birds are also restless, always moving about as if searching for something. This in part probably accounts for the fact that the fowls are poor in flesh and more or less in an emaciated con-

dition. They are never at ease on account of their restless attitude which is apparently due to nervousness. Normal exercise alone does not depress the condition of the bird, but rather the constant restlessness and uneasiness which is manifested by those that are infested.

The heavily infested chickens become emaciated and lose their color, the feathers become ruffled, and the plumage is not glossy as in the fowls that are free from the disease. Growing birds that were heavily infested, were found usually to be slender and quite poor in flesh, the head very thin and the comb pale. In cases of heavy infection the growing birds isolate themselves to some extent and often allow the wings to droop and hang at the sides. The sick birds, even though they isolate themselves, still manifest a great desire for food and water.

A slight infection is hardly to be detected in the droppings, but when it is heavy there is developed an irritation or inflammation of the intestinal epithelium, a kind of catarrh which results in a diarrhea, varying with the degree of infection. This irritation of the intestinal epithelium by the worms causes an abundant flow of mucus into the intestine. The mucous secretion is at first a clear, transparent semi-liquid, and sometimes slightly whitish. Worms which are slightly transparent are difficult to see, as they are imbedded in the mucus. Later the mucus takes on a brownish color which is due in part to slight hemorrhages of the epithelium caused by the irritation of the worms. This color of the mucus is retained until it is passed out with the feces so that the droppings of an infested bird have always a characteristic yellowish-brown color. This factor of coloration in the droppings is one that can nearly always be depended upon as a criterion of infection.

When the infection is heavy a gas is formed in the intestine which is noticeable in the droppings in the form of bubbles. These bubbles are present when the feces are first passed and remain in the semi-liquid droppings for some time. This is very characteristic in cases of heavy infection but is not noticeable at other times except in cases of extreme diarrhea, and then the gaseous formation is comparatively slight. In a flock that is heavily infested nearly every dropping detected about roosting or resting places shows the characteristic yellowish-brown color with a large number of small gas bubbles enclosed. The infested birds pass droppings often, though in small quantities.

Segments of the worms can usually be found when there is a moderately heavy infection, and eggs can nearly always be demonstrated by the aid of a microscope, but the latter method is not practical under all circumstances. When the above methods fail to show any signs of infection and an absolute diagnosis is desired it may be well to take a few of the birds that show some of the symptoms, kill them and make an examination of the contents of the intestine between the gizzard and caecum. Any infection which cannot be detected by the above methods is so slight that it is not harmful to the birds in any way, or is so recent that the cestodes are too small to be seen.

The best criteria for diagnosis are the emaciated condition of the birds, the great desire for food and water, and the marked diarrhea with the characteristic yellowish-brown color of the droppings; furthermore in cases of heavy infection segments of worms can usually be detected, though there is some degree of uncertainty in making gross examinations for the proglottids in the feces. The excretions from the kidneys are white in color and at times have somewhat the appearance of the tapeworm proglottides. This may at times be misleading to one who is inexperienced with this method of examination. The excretion from the kidneys can be readily distinguished from proglottids by placing the droppings in water and breaking up the mass. Proglottids have a definite shape and are firm, while the excretions break up into fine granules, or shreds which are easily disintegrated by shaking.

Some of the above symptoms for cestode infection are identical with those for nematodes: the emaciated, unthrifty condition, the ruffled, dull appearance of the feathers, and the more or less restless attitude of the bird. The feces, however, look quite different and often blood is passed with the droppings in cases of nematode infection. The nematodes produce hemorrhages in the intestine by boring into the epithelium.

Tapeworm infection is harmful according to the degree of infection. A slight infection does practically no harm to the bird, but when there is a heavy infection the condition is more serious. The intestinal inflammation or catarrh is quite a serious matter and in many cases may prove fatal. It brings on a more or less anaemic condition and the bird's general health is run down. Such a condition is suitable for the coming in of other diseases, since the fowl is unable to ward them off because of its weakened state

of health. Through these means the tapeworms are most harmful, as their effect works more or less indirectly with other diseases.

I have found instances where the worms were so numerous that they would form such a large compact mass in the intestine as to interfere with passage. These masses imbedded in a great quantity of mucus become lodged at the junction of the small and large intestines with the caeca.

One species, *Davainea echinobothrida*, produces nodules or ulcers in the intestinal wall which are often mistaken for other diseases. This has a more serious effect upon the chickens than some of the other species as it has more of a direct pathological effect.

Chickens infested with any of the species of common tapeworms devoured great quantities of food, but upon examination the intestines were usually found empty. It seems as if the food material after reaching the intestine rushes through rapidly on account of the large amount of mucus and the marked diarrhea. This does not allow the bird to obtain as much nourishment as it would otherwise. The cestodes of course absorb their nourishment from the chyme in the intestine. Furthermore, the excretions from the worms may also have some effect upon the general health of the bird, as some are without doubt resorbed into the system from the intestine.

More practical proof must be obtained by experimental study on the various effects and symptoms of infection in chickens before much can be definitely said on the subject. As yet there is but little known in regard to definite symptoms and effects except in a general way.

METHODS OF CONTROL. The subject of the control and treatment of tapeworm disease in chickens has not been studied extensively. There is need of more experimental data before much can be said concerning it. Several remedies, however, have been tried with some degree of success, although they do not seem practical when large numbers of birds are to be treated.

A practice general among poultry raisers is to isolate a sick bird and leave it to cure itself, or to kill it. Most poultry men do not take the trouble to treat a sick bird nor do they even try to find out the cause of its ailment, but simply say that it has "gone light." Such an expression covers a multitude of diseases prevalent among poultry. Birds that are heavily infested with worms

isolate themselves and become emaciated. They are also said to have "gone light."

As the first prerequisite for carrying on any sort of treatment for worm diseases, the infected birds must be isolated from the rest of the flock so that the latter can be kept free from contamination. The droppings from the sick birds must be cared for or destroyed in some way so that the embryos of the worms are killed and insects prevented from feeding on them. In general for any flock, preventive measures should be taken against infection of all kinds by keeping the surroundings clean and sanitary; all droppings around roosts should be collected often or subjected to such treatment as will render them harmless or inaccessible to insects. Wherever an infection is present, even if only slight, such preventive measures should be taken to eliminate all possibility of its further increase. One of the best is to collect the droppings about the coop daily and place them into vats or cans that are inaccessible to insects or worms; they are then treated with lime or some substance which destroys the embryos. Lime or ashes should be scattered over the droppings around the roosts and the resting places of the birds. This destroys the embryos and keeps insects from feeding upon the droppings. Furthermore, if the droppings are covered with lime and collected often it will prevent insects from breeding in them. House-flies especially, lay eggs in chicken manure if the droppings are not treated with lime.

Other features in the habitat of the birds should be kept sanitary; such are the feeding places and drinking vessels. Watering troughs should be so placed that the birds cannot get their feet into them, as they may carry in eggs or embryos of other parasitic worms (nematodes) which will reach the birds again through the water if the latter is allowed to stand in a filthy condition.

The location of poultry yards should be changed from time to time if possible, because if the same grounds are used from year to year some of the insects that may be the intermediate hosts of the tapeworms may become numerous and thus increase the possibility of infection. Embryos of parasites or germs of certain diseases remain on the premises from year to year, and if the yards are changed, more healthful conditions are produced for the birds.

In addition to destroying the eggs and embryos of parasites in the droppings, it is fully as important to destroy the adult insects and their breeding places. The life history of only one spe-

cies of tapeworm has been worked out in the United States, as is discussed elsewhere in this paper. This species is known to have its intermediate stage in the house-fly. House-flies breed commonly in bird or horse manure, or any decaying vegetable matter. The destruction of all such breeding places is a difficult matter and little can be done along that line or with the destruction of adult flies. However, fly traps* can be placed over the windows of the chicken coop and many flies caught and killed.

According to Stiles (1896:18), the principal remedies that have been used for the removal of tapeworms from poultry are such drugs as extract of male fern, turpentine, powdered kamala, areca nut, pomegranate root bark, pumpkin seeds, and sulphate of copper. These have been experimented with to a certain extent and have been found to be satisfactory in some instances.

The experiments with these remedies have been worked out on individual birds. Each bird must be treated individually. While such methods of treatment are thorough, they are not practical for a poultry raiser who has an infection in a flock of several hundred birds. It would require handling each bird separately two or three times, and demand a considerable amount of time; too much to be practicable on account of the expense involved.

I tried experiments on a number of birds to see whether a more practical method could be found. It had been observed previously that hogs infected with worms could be freed from them by feeding the ashes from corncobs. The ashes contain a large amount of sodium and potassium carbonate. Lye is made from ashes and of course contains similar substances, together with sodium hydroxide.

The following experiment worked very successfully: Fifteen birds which showed symptoms of tapeworm infection were placed in a cage which was insect-proof and were given the following treatment; A gallon of a mixture of wheat and oats, to which was added a small tablespoonful of concentrated lye, was cooked slowly for about two hours and allowed to cool. The birds were fasted for about fifteen hours and were then given as much of the mixture as they would eat, with plenty of water. Twelve hours later one of the birds was killed and an examination of the small intestine was made. It was found that nearly all of the worms in

*Such as described by F. C. Bishopp, Farmers' Bulletin No. 540, 1913.

the intestine were loose, the scolices being detached from the wall, and were also apparently dead. The rest of the birds were given a second dose twenty-four hours after the first. Many worms had passed with the droppings in from twenty-four to twenty-six hours after the first feeding. Most of the worms in these droppings were dead, but in all probability the embryos were still alive in the mature proglottids. Twelve hours after the second dose was given another bird was killed and it was found that only a few worms were left and all of these were detached and dead. The intestine was filled with a peculiar gray colored, slimy substance composed mainly of mucus. Many entire worms and fragments were passed with the droppings during the period of the feeding. The lye acted to some extent as a purgative.

The birds were given normal diet again, and in a few days they showed no symptoms of infection. Eight days after the second dose two more birds were killed and examinations made. One possessed a small fragment of a tapeworm and the other was entirely free.

The effects of such treatment upon the flock as a whole were shown later. While I was carrying on other investigations with chicken cestodes my father noticed that the birds were very heavily infested with worms. In an endeavor to free the birds of the worms and to improve their general condition he fed them a mixture of cooked grain and lye on July 15, unknown to me. As a result the entire flock of nearly four hundred birds was practically freed from the worms by a single application of the remedy. The cestodes were so thoroughly removed that there were not enough left to allow me to go on with my investigations and my observations on the worms were not taken up again until August 10, when the birds had become infested again and the parasites had grown to such size as to enable the continuance of my work.

This remedy is a very simple one and is practical. It has been known to many poultry raisers for some time, but they have neglected to use it, mainly on account of the fact that heretofore no definite evidence has ever been presented concerning its actual working possibilities. It may not, and in all probability will not, remove all the worms, but it does remove most of them so that they are not serious and can be controlled in the flock as a whole.

In a large flock the birds can be housed for the length of time required for the fast, then fed on the cooked grain and kept

in the house until after the effects of the second dose have passed off. During the time that they are confined the droppings should be collected often and lots of lime used about the coop and over the droppings to keep away the insects. In a flock the treatment would have to be repeated from time to time whenever the birds became infected again. Further experimental evidence must be obtained before much can be said in regard to details of this method of treatment, especially as to the amount of the alkali to be used. A large amount would be harmful to the intestinal mucosa, while a small amount would have little if any effect upon the parasites.

FEEDING EXPERIMENTS FOR INFECTION. Chickens in the vicinity of Hardy, Nebraska, were heavily infested with tapeworms, and young birds were found to be more heavily infested than the adults. This led to investigations concerning the reason for the difference in the infestation of the adult and young birds when they were together in the same environment and fed on the same diet.

The summer of 1913 was very dry in the locality which was a factor in keeping the numerous varieties of insects down to a minimum, because the drought interfered with their breeding. Upon observation it was found that only two kinds of insects were present in any abundance about the haunts of the birds. Those were the ground beetle *Tenebrio* and flies. The stable fly, *Stomoxys calcitrans*, which usually breeds in wet, decaying straw, was very scarce because its breeding places had dried up. The house flies were very abundant everywhere.

The reason why the adults should be only slightly infested with parasites, while the young and growing birds harbored so many, was then the subject for observation. The birds were watched in their haunts and their habits studied. It was soon noticed that the young birds, when in their resting places in the shade of a tree or a building, were busy the whole time pursuing flies and very often caught their prey, while the adults paid little or no attention to the flies. This led to the conclusion that flies might have something to do with the transmission of the worms to the birds.

With a view to testing this hypothesis, experiments were carried on with the worms that were most common in the birds. These species were *Davainea cesticillus*, *Davainea tetragona*, and *Choanotaenia infundibuliformis*.

Segments of these worms were teased apart so that the eggs or embryos were set free in a drop of water, and this was fed to flies

of the species: *Musca domestica*, *Stomoxys calcitrans*, and *Calliphora vomitaria*.

Only a few *Calliphora* could be obtained and these did not live long under experimental conditions. This species of fly does not frequent places where it would be likely to become the intermediate host of any of the chicken cestodes, as it always remains in cool, damp, and usually dark places, unless it can find carrion. However, on cool, dark, damp days it does appear in chicken yards, but its occurrence there is not frequent. Some *Stomoxys* were used, but in no case did they live long in captivity.

Musca domestica lived much longer than either of the others, even though it was difficult to keep them alive for a long period. After a great deal of experimentation it was found that they could be kept alive in a cage for twelve or thirteen days, and in one extreme case some were kept alive for twenty-one days. The flies in captivity were fed on blood, liver and spleen. These were found to be the best foods.

The oldest proglottids on the worm were usually taken for feeding to flies, and also some of the free segments in the intestine were used. The use of the oldest proglottids proved to be an error in the case of *Choanotaenia infundibuliformis*, because it was found later that in this species the oldest segments separate from the worm before they are entirely mature, but proglottids that have been free in the intestine for some time may be mature. The use of proglottids that were not entirely mature for feeding flies was an error in my experiments which may account for so few infections.

DAVAINEA CESTICILLUS. In a series of experiments 107 flies of the species *Musca domestica* were fed on the eggs from proglottids of *Davainea cesticillus*. Some were killed and preserved each day from the beginning of the experiment until the tenth day, when the remaining flies died, except in one case four were kept alive for twenty-one days. These were all sectioned with the exception of five, which were dissected. No stages of the cestodes were found in any of the flies when examined.

During the experiment microscopic examinations were made of a great number of the droppings of the flies and no eggs or embryos of the worms could be found in any case. It is certain that the flies got some of the eggs because they were numerous in the material that was fed to them. The flies would lap up all the water in which the eggs floated and would then suck on the fragments of

proglottids. In several instances when the flies were hungry it was observed that they would take small fragments of the proglottids between the labella of the labium and actually devour them. Since the eggs are microscopic in size it is practically certain that the flies got some of them.

Several *Calliphora* were fed on eggs from this species, but these flies lived for only two or three days.

Proglottids of this tapeworm were fed to a number of beetles of the species *Tenebrio melitor*. The beetles ate the segments readily. Some were killed at the end of one week, others at two weeks, and the rest at three weeks. These beetles were sectioned, but showed no developmental stage of cestodes.

DAVAINEA TETRAGONA. In experiments on this species 59 flies in all were used. Some of these were killed and preserved after from two to twelve days. The proglottids were broken up and the eggs set free in a drop of water. The flies lapped up the water with the eggs and afterwards sucked all of the moisture from the fragments of the proglottids. Therefore, it is very probable that the flies got some of the eggs. Microscopic examinations of the droppings of the flies showed no signs of eggs.

Material would pass through the flies in a few hours as was demonstrated by feeding them on blood. When the flies gorged themselves with blood they passed red droppings in from eight to ten or twelve hours. This indicated the length of time that it took material to pass through the alimentary canal. In this way the approximate time to make fecal examinations for the eggs was determined. However, examinations were made of the droppings after five or six hours as well as later and at regular intervals of two or three hours.

The flies were fed on eggs once or twice each day for three days. When they were fed once a day that was done in the morning, and when fed twice they were given one dose in the morning and the other at noon. On three occasions some flies were fed in the evening and fecal examinations were made the next morning and continued at intervals of two or three hours.

The flies were all sectioned and examined, but showed no stages of the cestodes in any instance.

Some *Calliphora* were fed upon the eggs of this species, but they did not live more than two or three days. Some beetles, *Tenebrio*, were fed on proglottids, but upon examination they showed nothing.

CHOANOTAENIA INFUNDIBULIFORMIS. Eggs of this species were fed to 88 flies of the species *Musca domestica*. Besides these some *Stomoxys calcitrans* were also fed, but these did not live long in captivity. The individuals of *Musca domestica* used in these experiments lived from two to seventeen days. Two flies lived for twelve days and four for seventeen days. The proglottids were broken up and fed to the flies in the same manner as in the other species mentioned. All of these flies were sectioned and examined. One fly preserved at the end of twelve days showed five cysticeri. These cysticeri agree very closely with the structure of the adult of this species, and the hooks are identical. This cysticerus is described in detail in another paper.

Grassi and Rovelli (1892: 33) found cysticeri in flies which they compared with this species. They found that there was a close agreement in structure between the cysticeri they discovered and the adult of *Choanotaenia infundibuliformis*. They therefore inferred that the larva they had was the intermediate stage of this species, but did not demonstrate experimentally its connection with the adult tapeworm.

During the process of my experiments I had hoped to be able to feed some chicks on flies that had been previously fed on tapeworm eggs, but as it was so difficult to keep the flies alive under experimental conditions such an experiment could not be carried out. However, another feeding experiment was tried with the following results: Six chicks were taken from the nest as soon as they were hatched and placed in a cage where they could get no insects and great care was taken during feeding so that no flies could enter. Flies (*Musca domestica*) were caught around the chicken roosts and fed to three of the chicks. The other three birds were used as a control and were given no flies. Fifty flies were fed to each of the three chicks. Three weeks after feeding, the chicks were killed and examined with the result that two were found to be infested with *Choanotaenia infundibuliformis*. One bird possessed six worms. These were of the same length, being 35 mm. long, and each one contained 103 proglottids. The other bird had one worm of the same species, but it was a little longer, 43 mm. and having 118 proglottids. This bird was fed on the flies three days before the one sheltering the six worms. The three birds which were used as a check on the experiments contained no worms when killed and examined.

These six birds were kept together in a cage and were fed on corn meal and bread crumbs. The three birds that were fed flies were caught and the insects were given to them from the hand.

A number of stable flies (*Stomoxys calcitrans*) were used in the experiments with this species of worm, but they would not live under experimental conditions for any length of time. They would usually die within 24 to 36 hours, except in one case when six lived for five days. They were sectioned, but nothing could be found.

On numerous occasions I have observed maggots in the droppings beneath the chicken roosts. Now, since house-flies are in the habit of breeding in such places, it seemed possible that infection might take place in the maggot stage of the flies. Experiments were then tried with the maggots of *Musca domestica* and *Stomoxys calcitrans*. Thirty *Musca domestica* maggots were fed on segments of three species of cestodes, *Davainea cesticillus*, *Davainea tetragona*, and *Choanotaenia infundibuliformis*. The maggots developed puparia in a day or two. Some were sectioned in the pupa stage. The rest developed into adults and were sectioned, a few were dissected, but only negative results were obtained. Fifty maggots of *Stomoxys calcitrans* were fed on proglottids of the same three species of tapeworms. The maggots went into the pupal stage within two or three days. Some were sectioned in the pupal stage. Most of them developed into adults and were sectioned while a few were dissected. No positive results were obtained from either pupal or adult stages.

From the foregoing it seems probable that flies are not the intermediate hosts for *Davainea cesticillus* and *Davainea tetragona*, as the experiments that I have carried on with them are extensive enough to appear conclusive. However, the small number of varieties of insects present in the locality seems to throw the burden upon the flies, since they were so abundant and observations show that they are taken and eaten by the chickens that are most heavily infested. The adult birds eat all other insects that are easy to catch, but since the flies are more difficult to take as prey they leave them alone. If the infection is direct, the adults would have fully as much chance as the young birds because they get food and water together and have the same environment.

In the case of *Choanotaenia infundibuliformis* it seems to be clear that the house-fly is the intermediate host. Grassi and Rovelli hold that it is the intermediate host on a purely structural basis. My experiments show that it is certainly an intermediate

host in some cases. Furthermore, feeding chicks on flies that were taken from about the chicken roosts and raising the cestodes make it probable that the house-flies are the intermediate hosts of this one species.

The reason why more flies were not infected by feeding on the eggs of this species was determined to be peculiar conditions in the maturing of the proglottid. At the time when the experiments were being carried on it was not known that the oldest proglottids separated from the worm before they are entirely mature. In the experiments the oldest proglottids on the worm were usually taken for feeding, though in some cases the free segments in the intestine were used. Since the flies were fed on eggs that were not entirely mature the embryos were digested. The free proglottids remain in the intestine of the bird for some time and in all probability mature there. Some such free proglottids were examined and found to contain mature embryos.

SUMMARY

1. The results of these experiments show that the intermediate (cysticercoid) stage of *Choanotaenia infundibuliformis* occurs in the common house-fly *Musca domestica*. The results were obtained by feeding flies on eggs of the tapeworm and raising cysticercoids in a fly; also by feeding chicks on flies and raising the worms in the birds. By morphological comparison of the cysticercoid and adult they are shown to be identical. Results from experiments by feeding flies on eggs from *Davainea cesticillus* and *Davainea tetragona* were negative.

2. The habits of the birds are important factors to be considered in experimental work for life history studies. Certain insects are found in great numbers around chicken houses and yards and are readily eaten by the birds. Flies are known to contain the larval stage of one species of cestode, and some other species of insects are to be considered as probable intermediate hosts for other species of cestodes.

3. The symptoms and effects of the infection from tapeworms vary with individual birds, age of birds, and the degree of infection. Birds infested with worms display an emaciated, unthrifty condition, an unnatural desire for food and water, and a marked diarrhea with droppings of a characteristic yellowish-brown color.

4. The control of tapeworm disease in chickens is in an unsettled condition. Little can be done until more is known concerning life histories of worms. Preventive measures are urged rather

than curative measures. Droppings should be cared for and treated with appropriate substances in order to prevent insects from feeding on them or developing in them. Experiments by giving lye with food to infested chickens showed satisfactory results in removing tapeworms.

5. The flocks of chickens that were studied showed at times a very heavy infection and nearly every bird examined harbored one or more species of worms. Five species were found in the chickens at Hardy, Nebraska, and three in the birds at the poultry farm at the University of Illinois. The species found in Nebraska are *Davainea cesticillus* (Molin), *Davainea tetragona* (Molin), *Davainea echinobothrida* (Megnin), *Hymenolepis carioca* (Magalhaes), and *Choanotaenia infundibuliformis* (Goeze). At the poultry farm of the University the species *Davainea cesticillus* (Molin), *Davainea echinobothrida* (Megnin) and *Hymenolepis carioca* (Magalhaes) were found.

6. A full description of the structure of these parasites has been published in the Transactions of The American Microscopical Society, Vol. 35, p. 23-44, Pl. 5-8.

BIBLIOGRAPHY

- GRASSI, B. B. and ROVELLI, G. 1889. Embryologische Forschungen an Cestoden. *Centrabl. f. Bakt. und Parasitenk.*, 5:370-377, 401-410.
1892. Ricerche embriologiche sui Cestodi. *Atti Accad. Gioenia di Sci. Nat. in Catania*, 4:1-108.
- PIANA, G. P. 1882. Di una nuova specie di *Tenia* del gallo domestico (*Taenia bothrioplitis*) e di un nuova cisticercio delle lumachelle terrestri (*Cysticercus bothrioplitis*). *Mem. Accad. Sci. Inst. Bologna*, 2:387-394.
- RANSOM, B. H. 1900. A new Avian Cestode—*Metrolia sthes lucida*. *Trans. Amer. Micr. Soc.*, 21:213-226.
1902. On *Hymenolepis carioca* (Magalhães) and *H. megalops* (Nitzsch) with Remarks on the Classification of the Group. *Trans. Amer. Micr. Soc.*, 23: 151-172.
1904. The Tapeworms of American Chickens and Turkeys. *Bur. An. Ind. Ann. Rpt.*, 21: 268-285.
1909. The Taenoid Cestodes of North American Birds. *Bull. U. S. Nat. Mus.*, 69: 1-141.
- ROSSETER, T. B. 1891. Sur un Cysticercoides des Ostracodes, capable de se développer dans l'intestin du Canard. *Bull. Soc. Zool. France*, 16: 224-229.
1892. On a New Cysticercus and a New Tapeworm. *Journ. Queckett Micr. Club*, 4: 361-366.
1897. On Experimental Infection of Ducks with *Cysticercus coronula* Mrazek (Rosseter), *Cysticercus gracilis* (von Linstow), *Cysticercus tenuirostris* (Hamann). *Journ. Queckett Micr. Club*, 6: 397-405.
- SCHMIDT, J. E. 1894. Die Entwicklungsgeschichte und der anatomische Bau der *Taenia anatina* (Krabbe). *Arch. f. Naturg.*, 1894, 1: 65-112.
- STILES, C. W. 1896. Report upon the Present Knowledge of the Tapeworms of Poultry. *Bur. An. Ind. Bull. No. 12*; 78 pp.
- TOWER, W. L. 1900. The Nervous System of the Cestode *Monezia expansa*. *Zool. Jahrb.*, 13: 359-384.
- ZÜRN, F. A. 1882. Die Krankheiten des Hausgeflügels. 237 pp., 76 figs. Weimar.

PARALYSIS OF PIGS

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Paralysis of pigs is a disease not uncommon in Iowa and causing quite considerable losses. It has been reported for more than ten years, but seems to have become more frequent in later years, especially now, when we get questions about it from all over the state. It may be said here, that many cases of lameness or rachitis, etc., are mistaken for paralysis, diseases which will not be discussed here, except for the purposes of differential diagnosis.

So far as our experience goes only young pigs (under six months) are paralyzed in the true sense; in no case was a single paralyzed pig found in a herd, but always several, and in most cases all belonged to the same litter.

The histories of the cases are always the same and as follows:

Several young pigs "go gradually down in the hind legs", first staggering as if weak and afterwards being unable to move the hind legs at all. No other symptoms besides these are apparent; especially the appetite is quite normal. After various periods of time ranging from a few weeks to several months, the pigs abstain from food and die. Yet some cases are reported where the lameness or paralysis partly or wholly disappeared. We never had pigs under observation from the start and cannot make any definite statement about that, but we never saw a pig improve. A few cases did not get worse, but did not improve, nor did they gain even in weight.

We generally secured our experiment pigs after they were quite seriously affected, kept them for different lengths of time under observation, killed them and made post-mortem examinations.

The clinical symptoms are totally confined to a motor paralysis of the hind, and sometimes of the front legs. Appetite especially, as mentioned before, is normal, even in pigs, which are not able to change their positions. There is no depravity of appetite, nor exceeding thirst. Temperature charts through 4-5 weeks of observation do not show any deviation worth mentioning. Blood counts and haemoglobin tests proved in three cases to be normal. After four weeks of observation, it becomes apparent that the growth of the diseased pigs is slower than that of normal ones. Yet I believe

that the paralysis alone which confines the pig so nearly to continuous rest accounts for that, and that no other organic disorder must be taken into consideration. Very often complications in form of decubitus set in and threaten the life of the animal. We never had any other complications here, but we frequently had reports, that the pigs desisted from eating a week before they died and became emaciated. I was not able to find any other explanation for that except decubitus and consequently septicemia, but it is of course possible that nerves which are vital are affected in the same way as the motor nerves of the legs. To return to the cardinal symptom, the paralysis, as said before, is a motor paralysis. The degrees of paralysis vary from a condition of slight staggering (Parakinesis) to practical impossibility of movement (Akinesis). Sensibility is always preserved, even in the worst cases and the tendon reflexes are normal. The least noticeable symptom of the beginning paralysis seems to be a certain stiffness in gait. The animals do not lift their hind legs from the ground and consequently often knuckle over. Tottering in the hind quarters, which is very conspicuous, is without doubt due to the inexact placing of the feet. Later on the movements become more and more hampered by the inability to lift the legs forward, and finally the legs are dragged behind, the pig sliding on the haunch of one side. Sometimes the front legs are affected. The same stiffness of gait is here the first symptom, then knuckling over, later walking on the carpus and finally complete paralysis, which compels the pig to lie on one side. We had three pigs, which became completely paralyzed in the front legs, so that they had to be fed by hand. The only free movements left concerned the muscles of head and spine. Even in these extreme cases the appetite was nearly undiminished and digestion, peristalsis, etc., unharmed. A conspicuous feature is the stiffness of the paralyzed muscles, which develops after several weeks of complete paralysis, and which is especially noticeable if passive movements are made, even after death. It is most likely due to the enforced rest of these muscles. Defecation and urination were always normal in the observed cases.

Macroscopical post-mortem examinations reveal nothing of importance. Especially the internal organs, the spinal cord, the nerves, etc., appear to be quite normal. There never were any inflammations of the dura or pia mater, or of the nerve sheaths. Careful examinations of bones were made, as we had reason to believe

that the disease in question is related to rachitis, but without result. Bone breaking tests revealed the strength of femur and tibia to be normal. The coxo-femoral joint sometimes was partly filled with blood and the ligamentum teres swollen on its proximal insertion. This condition proved to be quite acute in microscopic sections, and it was later found in normal pigs also, whose legs had been roughly handled before killing. The complications as decubitus and septicemia, found in late cases, have, of course, no bearing on the investigation proper.

Microscopical investigations and methods on the other hand are very satisfactory. The easiest way to demonstrate the most prominent histological change is to take a small piece of the sciatic or the axillaris nerve,—if the front legs are paralyzed too,—fix it in 10% formalin solution for a few hours, and treat it with 1% osmic acid. The nerve is then washed in running water, passed through alcohol and teased in oil of cloves. The immediate inspection shows a different proportion of the nerve fibres degenerated, viz., the myelin is often shrunk to different sized lumps, between which often are empty spaces; sometimes only the neurilemma is left, the axis-cylinder and the myelin sheath having disappeared entirely. The number of diseased nerve fibres in a preparation varies according to the part of the nerve which is inspected, and to the number of motor fibres present. Not only the sciatic and axillary nerves, but the smaller ones of the front and hind legs also contain degenerated fibres.

More elaborate studies of these conditions were carried on employing the Weigert-Pal and Marchi methods. The latter one deserves to be preferred, as the W. P. method shows only the lack of myelin sheaths but not the degeneration in progress. Preparations made after Marchi not only revealed the existing atrophy, but also the fibres in various states of degeneration. The attached plates show everything so distinctly, that detailed descriptions are unnecessary. I only want to say, that signs of perineural inflammation never were observed, even light cellular infiltrations were entirely absent. The appearance of a degenerated nerve fibre in the longitudinal section of a Marchi preparation is the same as if treated after the above mentioned osmic acid method, so a special illustration of the latter is omitted. The Marchi method shows the normal myelin sheaths, the Ranvier nodes and the Schmidt-Lantermann segments much more plainly. Instead of the degenerated

nerve fibres, connective tissue is formed; the myelin detritus is apparently resorbed in a short time. There are different degrees in the extension of the atrophy, but I never saw a fasciculus totally depleted of normal fibres. In the average and generally, half of the fibres are destroyed, but, of course, any condition can be observed. In clinically bad cases, the greatest number of fasciculi are found to be attacked. All this applies to the nerves of the front legs as well as to the nerves of the hind legs.

In the course of this investigation, it was necessary to make normal preparations as checks, especially since the appearance of the spinal cord treated with the Marchi method was quite questionable. Many black conglomerations, similar to myelin detritus were found, and it was not until I found the same phenomena in the normal tissue, that I read Cassirer's paper on "Traberkrankheit", ("Trembles in Sheep"), where he reports similar findings in normal cords of sheep. These black bodies are of uniform size, and distributed nearly equally through the white matter. Weigert-Pal stained sections of the spinal cord are quite normal and correspond to the normal check preparations, especially there are no degeneration areas. The Nissl stain does not show any abnormality in the chromatin bodies of the ganglion cells.

There is one disease reported in the literature of medical investigation, which is rather similar to the disease in question. It is the above mentioned "Traberkrankheit der Schafe" (Tremblente, French; Trembles, Engl.). Investigations of this malady of sheep have been made by Besnoit and Morel, and Cassirer. The clinical symptoms are as follows, citing Hutyra and Marek:

In the early stages excitability, trembling, spasmodic muscle contractions. Then motor disturbances develop, the gait becomes uncertain and peculiar trotting like movements are seen. Owing to the weakness of the quarters the animal cannot move quickly, much less jump over mounds or ditches. In the later stages the fore limbs become weak, the animals stumble along, keep falling down, rising being accomplished with great difficulty. Defecation and urination are normal up to the end; according to Cassirer the reflexes and sensibility to electrical stimuli are normal.

In the majority of cases pruritus at the root of the tail, of the gluteal region, later on of the hind and fore legs is present. The animals rub and gnaw those parts violently. The appetite remains good up to the end, yet anaemia and emaciation become more and

more apparent, finally the weakness of the hind quarters becomes so great, that the animals lie on the ground as if paralyzed, and die from complete exhaustion. The course of the disease takes two to four months. Recovery is very exceptional and occurs only in the early stages of the disease.

Besnoit and Morel, who made histological examinations, report to have found in the ganglion cells of the spinal cord a "désagregation plus ou moins marquée de la substance chromatique," but only a few cells are changed. In the small peripheral nerves they describe a parenchymatous degeneration, identical with my findings. "Dans les tubes malades, le cylindre axe a disparu, la myéline est réduit en boules." "Dans d'autres tubes, les lésions sont plus intenses encore; la myéline, les noyaux, le protoplasma ont disparu; sur une étendue plus ou moins considérable l'élément nerveux se trouve réduit à la gaine de Schwann."

First they did not find lesions in the large nerve trunks, but in a postscript they state that similar changes can be found in the large nerves, if the disease was in the last stage. Their attached microphotographs show the diseased nerve fibres quite similar to my own preparations.

Cassirer on the other hand was not able to find any anatomical changes in the examined tissues, in spite of diligent methods. He conceives the disease as a chronic progressive neurosis and compares it with the pseudo-sclerosis in man. In spite of this, Huttyra and Marek are inclined to see in it a polyneuritis. A further investigation is necessary to clear up this question, but still there is no doubt that the disease described by Besnoit and Morel has many points in common with the paralysis of pigs and justifies a close comparison, regarding etiology and prophylaxis.

It is rather certain that the paralysis of pigs is not infectious. Experiments to produce the disease by intravenous blood injections, by intra-muscular injections of ground nerve tissue near the nerve, and by contact have been so far unsuccessful. Furthermore, reports which came in, show that there is, at least some times, an inherited predisposition in the diseased animals. In one herd of 30 pigs, consisting of 17 Chester Whites and 13 Durocs, only the latter contracted the disease. In other cases several owners were able to trace the outbreak to one boar. So far only outbreaks in Poland China and Duroc Jersey herds are known to us. I give a few numbers (—of herds investigated—) to show the general conditions of an outbreak;

Breed	No. of Young pigs	No. of dis- eased pigs	No. of pigs killed	No. of pigs which died	No. still sick	No. pigs recovered
1 Duroc	58	5	3	—	2	—
2 Duroc*	80	5	4	1	—	—
3 Pol. China	21	7**	2	5	—	—
4 Duroc	75	3	3	—	—	—
5 Pol. China	150	15	5	7 or 8	—	2-3

*No histological examination made.

**One litter.

The etiology of the trotting disease in sheep is not known. Infection, food intoxication, hereditary tendency and disposition by inbreeding are named as causes. Nothing has been proven yet, but since the best prophylactic measures are rational breeding, and elimination of diseased animals from the breeding stock, it seems to me that the hereditary tendency should be considered as the most important cause. There are cases reported where the change of the pasture, viz:—from a wet one to a higher and dryer one, stopped the outbreak and as the last year here in Iowa was a particularly wet one and as in the same time the paralysis of pigs spread quite noticeably, emphasis should be laid on having dry quarters for the animals. Still the chief measure to prevent spread of the disease would be careful elimination of all diseased animals from breeding, possibly even of the parents, viz:—when succeeding litters of one sow are diseased, or many of the off-spring from one boar. Food intoxication and infection can be safely disregarded in our case.

The differential diagnosis of the disease may have difficulties, if only one pig or two are "lame." We had several cases, where the symptoms were quite similar to paralysis, but where we found rachitis inflammations of the femur epiphysis and in one case separation of the caput femoris on both sides. These latter cases were caused by the exclusive feeding of linseed meal, and should have been diagnosed properly by careful examination. Rachitis is of chief importance in the differential diagnosis, but there is, of course, no paralysis and the gait is variously abnormal due to the deformities and sensitiveness of the bones. In nearly all the cases there are other evident rachitical symptoms, which can hardly be overlooked. There are still the cases of combined paralysis and rachitis—cases we had,—where only the course of the disease or an histological examination is deciding.

Sows often are paralyzed after parturition, but I doubt if the same polyneuritis will be found here as in the young pigs. I exam-

ined one case, without finding anything, and another case recovered under observation. Among cows a similar disease is quite frequent: "Paralysis after parturition", and I rather believe that the same condition occurs in sows. In some cases, it may be only exhaustion and weakness due to the lactation period.

To resume, there is an endemic disease among pigs, generally called "Paralysis", which proved to be a "Polyneuritis parenchymatosa." Because of the course and the nature of the disease, therapeutic measures are not advised, but prophylactically the elimination from breeding of all animals, whose offspring repeatedly incline to the disease, and of all diseased animals, even when recovered, and the eventual change to dry quarters and proper food will most likely be successful.

(I wish to thank Dr. Chas. Murray for his help in securing the material and making the post mortems.)

REFERENCES

1. HUTYRA AND MAREK: *Pathologie und Therapie der Haustiere. 4 Auflage.*
2. BESNOIT ET MOREL: Note sur les lésions de la tremblante du mouton. *Rev. Vet. 1896, p. 397.*
3. CASSIRER: *Virchows Archiv, 1898, CLIII, I.*

EXPLANATION OF THE PLATES

No. 1. Pig with motor paralysis of the hind legs.

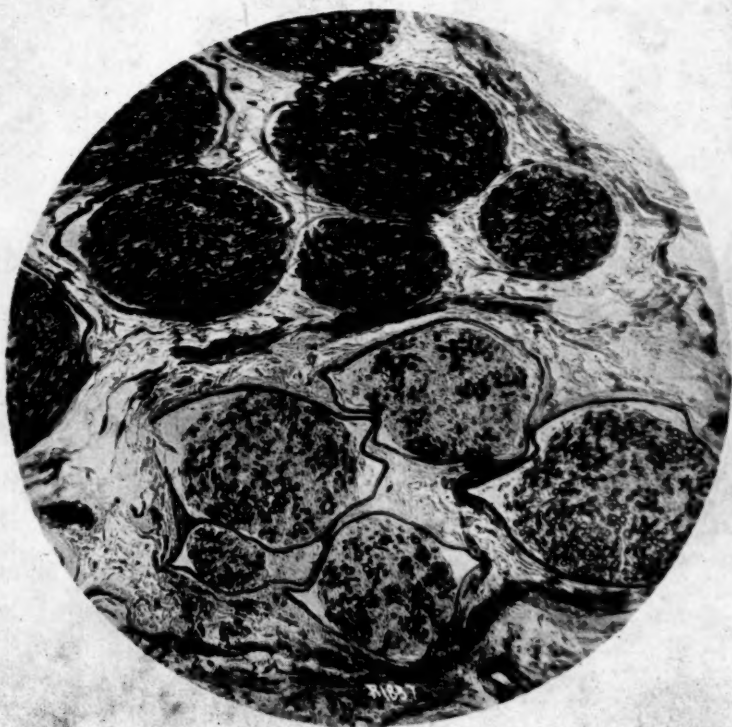
No. 2. Cross section through the sciatic nerve of a paralyzed pig. Stained after Weigert-Pal. The five fasciculi in the lower half of the picture show degeneration of nerve fibres.

No. 3. Same as in No. 2. Stained after Marchi.

- a. Fasciculi, whose nerve fibres are partly degenerated.
- b. Nerve fibres in fatty degeneration.
- c. Fat.

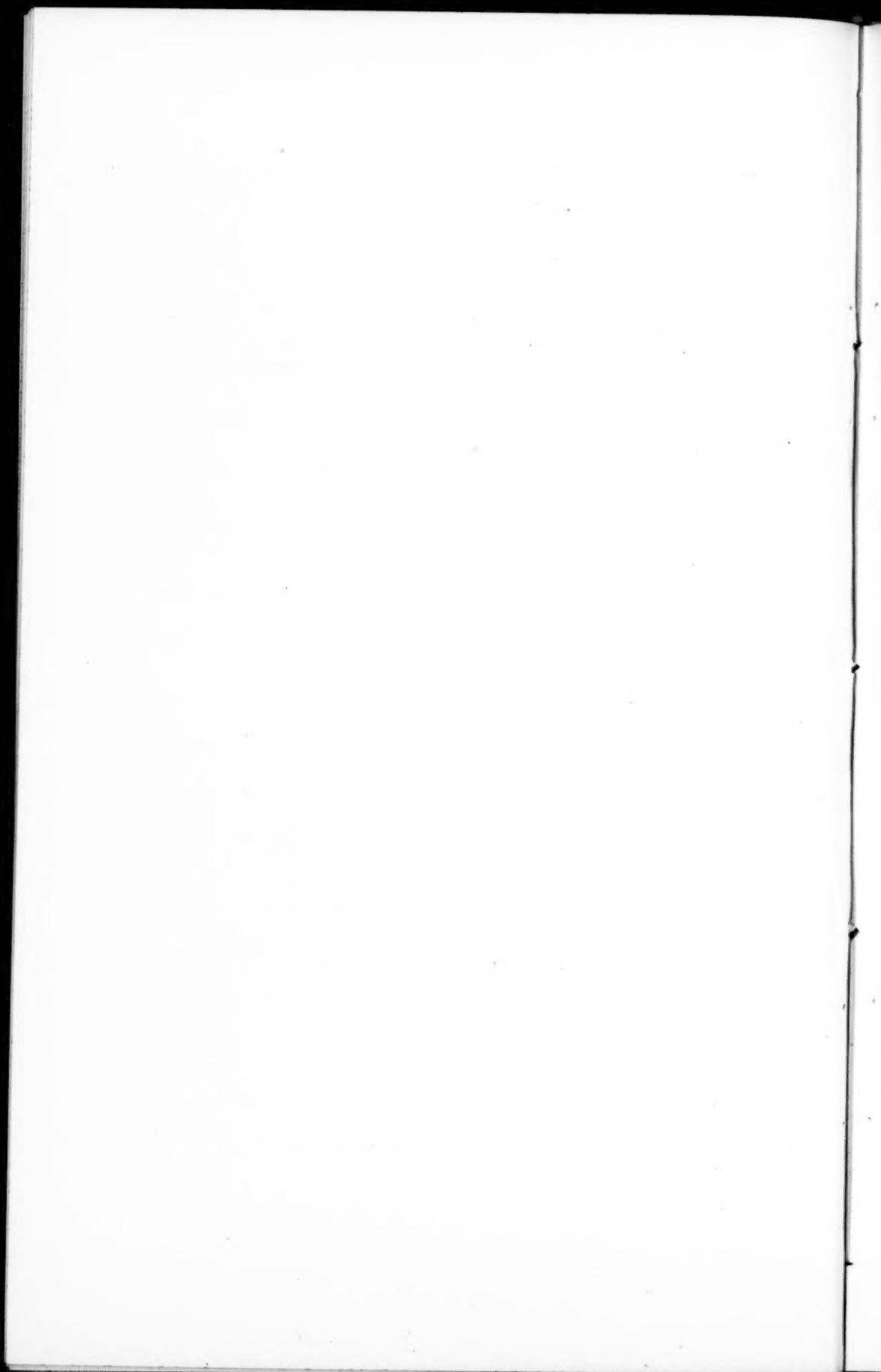
No. 4. Longitudinal section through sciatic nerve, stained after Marchi. High power.

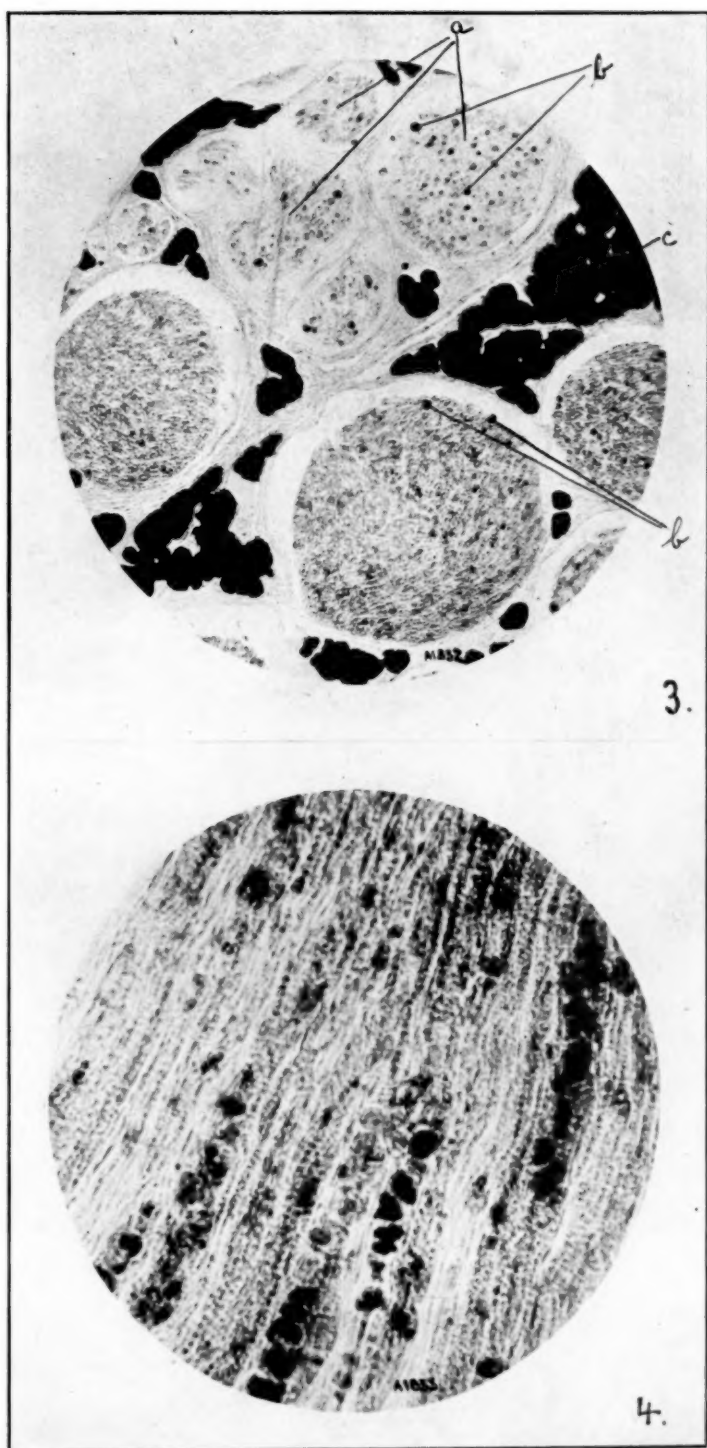
In the degenerating nerve fibres the myelin detritus is seen as black clots.



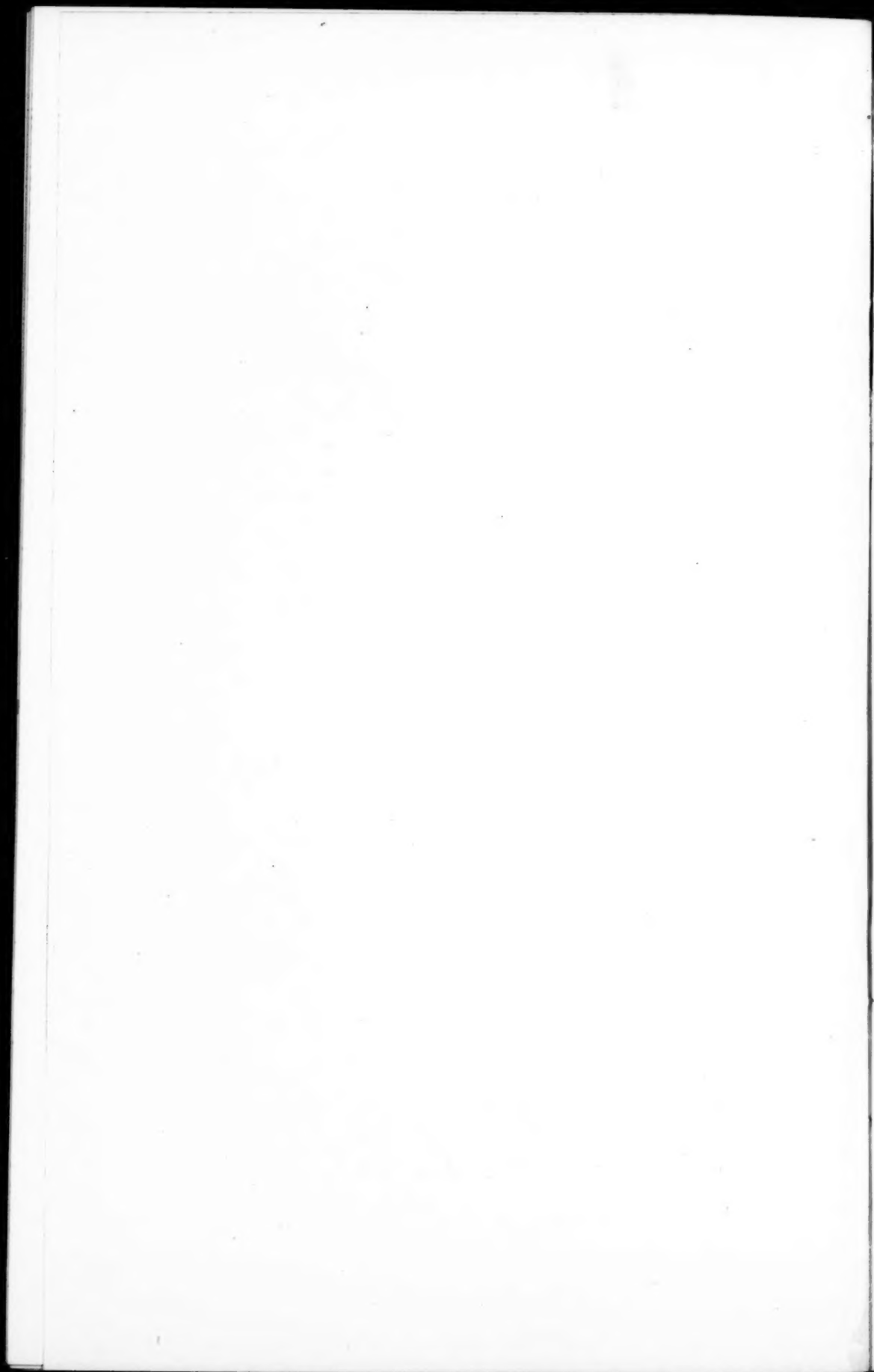
2.

Paralysis of Pigs. PLATE I.





Paralysis of Pigs. PLATE II.



HOG CHOLERA*

EDW. A. CAHILL, Boston, Mass.

For many years it has been the belief in the East that hog cholera was a disease peculiar to the corn belt section of the West, and rarely seen in New England. Although it was known that large numbers of swine died each year, it was thought that the cause of these deaths was pneumonia, and in some instances inflammation of the bowels. Statistics showed that whereas in 1912 there were 98,836 head of swine in Massachusetts over six months of age, that in 1914 this number had decreased to 59,221, a visible decrease of 39,615 in two years.

Acting on this knowledge, the Massachusetts Department of Animal Industry started an investigation to ascertain the cause of this decrease. The result of this investigation showed that approximately 5% of this decrease was due to a shortage of garbage, and that the remaining 95% was due, not to contagious pneumonia, as had formerly been supposed, but to hog cholera.

It was learned that hog cholera, as seen in New England, differs somewhat from the type usually seen in the West, and that the acute form was less frequently seen but that we had to deal with a more chronic form, combined with a secondary infection by an organism known as *Bacillus suissepticus*. This secondary infection caused an associated pneumonia, which had given rise to the belief that the disease was true pneumonia. One of the reasons for this belief was the fact that the majority of the animals which died did so in the late summer or early fall, as the weather commenced to get cold; and secondly, to the fact that the big majority of the losses in large droves of swine were in animals weighing from 40 to 80 pounds, whereas the mature stock seldom, or never, died from this disease. The explanation of this condition is as follows:

The majority of the large piggeries in this state we found to have been infected with the form of hog cholera already described for many years, and because of this fact, the mature sows were either fully or partially immune to the disease. It is a well known fact that pigs from immune sows are themselves immune

*Abstract of an address delivered at Farmers' Week at the Massachusetts Agricultural College.

while nursing, but that as soon as these animals are weaned, this temporary immunity begins to wear off, and about the time the animals reach forty pounds weight, this immunity has entirely disappeared. It might be remarked in passing that pigs are weaned earlier in the East than the West. These animals are then susceptible to the disease, and commence to die, and it is a fact that many of the large piggeries in the state have lost thousands of pigs between 40 and 80 pounds weight. The pigs which survive this period have almost invariably had a light attack of the disease, but recovered. They are, therefore, immune, and no trouble is seen from this time until the next litter of pigs reaches this age. This condition is rarely seen in the West, where the acute type is seen more frequently, and where the mortality averages nearly 100%, and this knowledge furthered the belief that the disease seen here was not hog cholera.

This condition of chronic hog cholera having existed for so many years unrecognized, particularly in the large piggeries which sell pigs all over New England, has resulted in hundreds of cases of hog cholera being spread by the distribution of these pigs. It is a common occurrence to find the owner of swine who has never had hog cholera in his herd until he purchased a few pigs from one of these large piggeries, and within a short time having a severe outbreak of cholera throughout his entire herd, even though the animals coming from the infected piggery might be apparently well. This condition has undoubtedly spread more cholera in New England than any other method.

Among the many other ways that cholera has been spread, must be mentioned the enormous flocks of crows which travel from piggery to piggery particularly where garbage is fed, stray dogs and cats, skunks, field mice, the interchange of labor, traveling butchers and salesmen, and our numerous transportation companies.

We must remember that our local conditions are entirely different from those of the West, and more conducive to the spread of this disease. The majority of our swine are garbage fed, and garbage is one of the greatest means of spreading the disease, both through pork scraps which it may contain and the fact that in our large cities the swill is generally collected and brought to a central distributing point. In some instances, as many as two hundred farmers from the surrounding country meet at this central distributing point to obtain garbage for their swine and you can read-

ily appreciate the fact that this often acts as a central distributing point, not only for garbage, but for hog cholera as well.

Until quite recently, no serious effort had been made to control this disease, and no preventive or curative methods were known with which to combat it. Consequently, it was the common custom when cholera was diagnosed in a herd, to kill the infected animals and butcher the ones which were apparently well, leaving a badly infected premises from which cholera could be spread, and putting meat into circulation which in turn caused more trouble.

Realizing that the disease is an extremely contagious one, and because of the above-mentioned conditions, had resulted a condition wherein the majority of the piggeries in this state are either infected with hog cholera at the present time or have been very recently, and that this condition was rapidly ruining the swine industry of the state, the Massachusetts Department of Animal Industry nearly two years ago started a campaign for the control of this disease which consisted of the application of the serum treatment as a preventive and cure, and an educational campaign.

Those of you who read in agricultural publications of the experiences of persons who have used the serum treatment on their swine, know that the utmost confusion and difference of opinion exists as to the value of the treatment. You know that in some sections of the country it is hailed as a blessing, whereas in other sections it is condemned as a curse, and blamed for the spread of the disease. It is a well-known fact that the serum treatment has been responsible for the spread of hog cholera, in instances when the serum used was not potent or virus not virulent, and therefore dangerous; and in other instances where perhaps the best serum and virus were used improperly by incompetent persons. Contrasted to this, are seen sections where the most beneficial results have been derived by the proper use of good serum and good virus by competent persons. Therefore, we considered that it was of primary and utmost importance to control the use of serum and virus, and consequently its use has been restricted to the Department of Animal Industry. It is against our regulations for any serum or virus to be shipped into the state, except to the Department of Animal Industry.

Notwithstanding the fact that the U. S. Government makes a test on serum and virus before it leaves the manufacturer's hands, every shipment of serum and virus after arriving in Massachusetts

is tested by a special test to prove to our satisfaction that it is of the highest quality and that the consumer is being safeguarded. After being thoroughly tested, it is properly kept until it is placed in the hands of agents of the department, who are men specially trained in this work, who are paid by and responsible to the Commonwealth. This, therefore, acts as the greatest possible safeguard to the consumer, and is a guarantee against the spread of the disease through the use of products which are not what they should be or by improper use of good material. While this method prevents some persons using serum and virus who are perfectly competent to do so, it prevents the many possibilities of the spread of the disease by the means before mentioned.

Since the campaign to control hog cholera was started, approximately 35,000 head of swine have been treated, and we know that in many large herds where formerly hundreds of animals were lost yearly, the losses have been reduced to practically nothing, and it is a fact that the disease is on the decrease, and that the number of swine in this state is increasing very rapidly.

Realizing that the simultaneous treatment, when properly applied, is an absolute preventive, and that practically all swine in this state are exposed swine, we are advocating the simultaneous treatment for all swine which are healthy. This must be considered in the form of insurance, inasmuch as animals can be immunized as a preventive at the minimum cost with the maximum amount of protection, and that the cost of this insurance for healthy animals is not over 1c per pound, which pays for the serum and virus, the state defraying all other expenses. This immunization work is carried out only at the request of the owner, and cannot be given to animals after they become infected. Infected animals must receive the "serum only" treatment, and it must be remembered that the money entailed in the loss of one or two brood sows would more than pay for all the serum and virus which would be required on a large number of animals. Where the serum is used, however, on sick animals, the results must necessarily be different. Although no person claims a great curative value for serum, we know that it has some curative value. The degree of this, however, is always more or less of an uncertainty, and depends largely upon the stage of the disease at the time of treatment.

A few of our statistics for the last year may prove of interest. In approximately 250 herds which were infected, the animals were

divided into two classes; first, sick animals showing clinical symptoms, or temperatures over 104; and secondly, apparently well animals in these infected herds. In these herds, approximately 7000 head of swine had died without treatment previous to our assuming control. The remainder of the sick animals, 10300 in number, were given the "serum only" treatment. Of this number, all lived except 718, or 7%. The remainder, which constituted the apparently well animals, were given the simultaneous treatment. There were 5,826 such treatments. Of this number, only 70, or 2.2% died. This is in strong contrast to the usual mortality where serum treatment is not carried out, which as you all know, varies from 85 to 100%.

In 90% of these herds the losses of young pigs had varied from 50 to more than a thousand yearly, and the owners considered it necessary to expect these losses. The treatment has now been carried out in some of these herds for two years, and during both years practically the entire number of young pigs born has been raised without any losses from cholera. It must be realized that the treatment was being put to a severe test under the conditions of all animals being garbage fed, and cholera having existed in the herds from five to twenty years. Where the treatment has been used as a preventive, and no cholera existed at time of treatment, only one out of approximately 6,000 animals treated has died with hog cholera following the treatment.

This illustrates the fact that when properly tested serum and virus is used under proper restrictions by trained men, the danger from simultaneous immunizing is practically nil, and I want to go on record as saying that if we are to stop the spread of hog cholera by the simultaneous treatment, the states which are not restricting the use of serum and virus, and are not testing the same after delivery, must adopt restrictions a little nearer those which are in vogue in this state.

I would like it distinctly understood that I do not maintain that the policy advocated here and followed by the State of Massachusetts is the policy which should be carried out in all states. Local conditions must always govern the plan for control, and while the promiscuous simultaneous treatment is advisable in Massachusetts, due to the almost universal feeding of garbage, the close proximity of piggeries to each other, and the fact that practically all swine are exposed swine, this would not apply to some states where

whole territories larger than our state are free from the disease. It is a fact, however, that unless the use of serum and virus becomes restricted, and under the jurisdiction of the state authorities, that the time will soon come when there will be no territory which is not infected.

We offer the following general routine as the best method for farmers throughout the state to follow as regards hog cholera: To have the Department of Animal Industry immunize by the simultaneous method all of their swine above 40 pounds weight. These animals are then permanently immune. The pigs from sows so immunized will be immune while nursing. At weaning time, these pigs should be given a small amount of serum, which will usually protect them until they are twelve weeks old. At this time, they can be given the simultaneous treatment at the least expense, and the immunity will be permanent. This is done with the idea that the owner is going to continue the work and keep all swine immunized as they may be purchased or born.

In closing, I would offer a word of advice to those of you who do not immunize your swine. Do not purchase pigs from large piggeries which do not immunize their swine. You can purchase animals from other piggeries just as large and just as good which are immunized when you buy them. The men who are doing this should have your support, and in addition you are protecting your own interests in acting in this manner. Make it a practice to quarantine on your own premises all new swine for at least thirty days before they are placed with your herd, and lastly, insist that all animals, regardless of where they come from, be thoroughly dipped in a good antiseptic solution the last thing before they are put into the herd. This will prevent a large amount of trouble, and may save you many dollars.

The serum treatment is not compulsory in spite of the fact that there is already a large demand on the part of swine owners who see the value of this treatment, to make it compulsory. It is simply an effort on the part of the Commonwealth and the State Livestock Sanitary authorities to do their share in helping the farmers prevent the hundred million dollar loss which is the yearly toll of this disease. Some there are who boast of the fact that they do not need to immunize their swine even though they have the disease in their herd, and it is these men more than any others, who make others pay the heavy loss which is the toll demanded for the right

of our independence in refusing to immunize swine. If all the swine in this state were immunized by the simultaneous treatment for the period of a few years, the disease would die out of its own accord for the want of susceptible animals on which to propagate itself, and this frightful loss would be stopped.

THE NATIONAL HORSE

R. VANS AGNEW, 5th Cavalry, Fort Leavenworth, Kans.

We need several Government Breeding farms of ample size, located on the best of soil so as to breed a superabundance of bone substance in our animals. The Government Farms to be so centrally located as to be practically free from invasion. In this European war it is authentically reported that the Russians, in their first invasion of Prussia captured and sent back to Russia 20,000 head of thoroughbred mares belonging to the large Government farms. This is a fearful loss to any country.

Also these farms can breed high types of blood horses that can be used as remount stallions to be placed in different parts of our States where no privately owned sires are operating. This will to a certain extent insure the army type we want, particularly if we charge a nominal price to mares of approved type.

But what we really should put into effect is the giving of large enough National Remount Premiums so that owners of good stallions and mares would not want to sell them to foreigners, especially if we make a law that the animals are not to leave the country for a certain number of years after winning a premium. These National Premiums should be financed by the Federal Government and managed by a National Committee composed of noted horsemen (like members of the Jockey Club), noted breeders and army officers (retired or in the service). The judging of these premium competitors in each state to be done by one person chosen by the committee; the head of the State agricultural school and the State veterinarian.

In order to start this, there would have to be census taken of all the thoroughbred stallions in the country and a registration made of those that were sound enough for service as premium competitors.

That the castration or altering of young thoroughbreds be checked as much as possible (it would be if premiums were started).

That laws be passed in every state that only pure bred stallions of each type be permitted to serve mares for a fee.

That full information in regard to the breed, sex, age and value of all horses imported and exported be made by owners to the Government.

That every year each State awards two National premiums of the value of \$15,000.00 each for the stallions; six National premiums of the value of \$100.00 each for mares and six National premiums of the value of \$100.00 each for foals.

Mares not to be awarded premium unless they have a living foal by a premium sire or drop a living foal to one the next year; mares to be between three and fourteen years old. Foals not to be awarded premiums unless a guarantee be given by the owner to sell the animals when they are three years old to the Government for \$150.00; no foal to receive more than one premium.

Premium stallions to be stunted, to not less than seventy mares a year at a fee of \$5.00 per mare to be paid by the owner of the mare. That the premiums be competed for at each State Fair and at any other horse show in the States chosen by the committee.

This system will greatly interest the farmer and breeder in our remounts and encourage him to keep the right type of animal. The committee should have the power to buy any high-class stallion that was in danger of being sold to another country and turn him into the National Remount System. It should award special prizes to the breeders of premium winners. It should give prizes at the shows in each State for the best remount horse for cavalry or artillery.

It may be said that some States cannot raise a good enough class of animal for army work owing to the climatic conditions, etc., but this is largely imagination, it is a question of good parentage, good food and plenty of exercise. A good Northern horse will do no better than a good Southern horse, when it comes to speed and stamina. The more bracing climate of the Northwest adds to the vigor of its horses, but a Southern horse taken up there will become just as vigorous under the same conditions. In fact the climate that permits of grazing the year round is the most ideal one for the breeding of horses if the grasses are rich in the proper constituents that promote bone and substance, a horse properly

raised in a temperate region can be taken to the severest climates either hot or cold with complete assurance that he will do satisfactory work. The thoroughbred has proved this beyond a doubt.

This Federal aided National system will be most beneficial to both breeder and racing man, the one gets better prices for those he breeds, the other can sell his retired racers for a larger figure. It is a question of preparedness, even the non-preparedness advocate cannot object to improving the horses of his country.

As a national question I earnestly hope, that our great horse-owners, breeders and racers will not look at this horse business from the narrow view of home or local state politics, that enough of them will get together as soon as possible and draft a far better scheme than the one I have ventured to outline, that they will then give it to some horse loving, patriotic Senator or Congressman to pass into a law that will be of incalculable benefit to us and our descendants and their descendants.

For the small sum of about \$275,000 dollars a year we can start the National improvement breeding system that I have roughly sketched, surely Congress will not begrudge the people that paltry amount when it has the examples of other nations who are giving millions towards the betterment of the light-horse breeds of their countries.

Let us do something for the National Horse.—*Thoroughbred Record*.

At the Panama-Pacific International Exposition held at San Francisco, Cal., last year, the "American Veterinary Medical Association Day" (September 3, 1915) was, in point of attendance, one of the largest convention special days. A total of 70,560 people passed through the gates on that day. There were 928 conventions in the exposition series and these were largely responsible for the large attendance and for the very satisfactory financial showing that has been made.

CLINICAL AND CASE REPORTS

CASE REPORTS OF LYMPHANGITIS IN CATTLE CAUSED BY AN ACID-ALCOHOLIC FAST ORGANISM

J. TRAUM, Agricultural Experiment Station, Berkeley, California.

On November 20th I received for examination a nodule about the size of a hen's egg, which had been removed on November 18th from the subcutaneous tissue of a cow corresponding to a point about the center of the humerus. Upon section this material was found to contain in its center an area of coagulation necrosis about the size of a hazel nut, surrounded by a dense connective tissue which in turn showed many small sized necrotic foci. Smears made from these necrotic areas and stained by Ziehl-Neelsen method, decolorizing with 20% sulphuric acid and also with 95% alcohol or with 3% acid alcohol (hydrochloric), showed organisms which could not be distinguished morphologically or tinctorially from tubercle bacilli.

The history of the cases concerned, as reported to us, is as follows: Early in October the above mentioned cow (No. 1, figure 1) and another cow (No. 2, figure 2) each presented an enlargement about one and one-half inch in diameter, back of the knee, in cow No. 1 the left knee being affected, in cow No. 2 the right. The dairyman had been treating these with tincture of iodine. This treatment produced no apparent improvement. The abscess on cow No. 1 was discharging a cream colored, glutinous, odorless pus, containing yellowish, calcareous granules at the time when the nodular mass above mentioned was removed. It was found then that the disease process had extended on the external face of the limb up to the shoulder joint, following the course of the lymphatics, and manifesting itself in the form of corded nodular masses varying from the size of a bean to that of a goose egg. In cow No. 2 the disease presented a similar picture, but was not so extensive, the nodules being smaller and fewer in number.

As indicated above, the microscopic examination suggested a diagnosis of tuberculosis, but the location of the lesions on the three animals (another cow, No. 3, having developed similar lesions on the right front leg) together with the fact that although semi-

annual tuberculin tests were made no reactors had been found in this herd during a period of two years, did not warrant this diagnosis. Another nodule was removed from cow No. 1 on November 24th, carefully handled, and taken to the laboratory and upon microscopic examination revealed the presence of acid-alcoholic fast organisms which resisted the action of antiformin.

In the middle of December a fourth cow showed four small subcutaneous nodules in back and a little below the left knee.

The nodules in all these animals were firm on palpation, but all the removed nodules were found upon section to contain necrotic areas which in most instances had reached a stage of liquefaction. Some of the nodules were difficult to remove intact, since the pus had made its way to their outermost zones. Histologically the nodules showed a structure similar to that found in the granulomata. Giant cells and acid-alcoholic fast organisms were observed in the sections, in some instances the organisms being abundant, in others very scarce. Tubercles, found upon microscopic examination, especially the small ones, were indistinguishable from those caused by the tubercle bacillus.

The organisms in the solid necrotic areas were more plentiful than where liquefaction was present. In most instances, they were 3 to 5 μ in length and beaded, appearing to be made up of two or more coccoid or bacillary members; some were fine, thin, straight rods, about 2½ to 3½ μ in length, others were slightly longer and slightly curved or bent, others still showed one end larger. Coccoid forms were also found. The organisms retained the color when stained by the Gram method. When stained by the Ziehl-Neelsen and counterstained by the Gram method, organisms with one or two acid fast portions and a Gram positive granule were observed.

On February 12th pus that had been obtained by Drs. Hill and Caldwell of Oakland from the vicinity of the fetlock joint of the left hind leg of a cow (No. 5) was brought to my attention by Dr. F. W. Wood of the Cutter Laboratory. This pus appeared very similar to that obtained from cows 1, 2 and 3. Microscopic examination in this case also showed similar acid-alcoholic fast organisms. Drs. Wood, Hill and myself visited the dairy, owning cow No. 5, on February 19th, and found a sixth case. In this last case we found a soft tumor, about one inch in diameter, back of the right knee, and nodular masses extending upward to a point below the shoulder on the outside of the leg, very like those found in the other cases. In

case No. 5 at one point the pus had made its way to the surface from a small nodule, presenting an ulcer which was very like in appearance to the buds found on the limbs of farcy horses.

The clinical picture suggested streptothricosis (Farcin du boeuf). The presence of acid fast organisms did not tend to weaken this diagnosis, but rather supported it, since bacillary acid fast forms have been described as being present in this disease. In all our work, however, we were unable to find any branching filamentous forms. The large number of tubes of varied culture media inoculated from these cases have thus far failed to yield any definite results. Animal inoculations have up to date been of no assistance in establishing a definite diagnosis. They, however, eliminated mammalian tuberculosis, since a large number of guinea pigs inoculated subcutaneously and intramuscularly with material, which, as evidenced by microscopic examination, contained a great many acid fast organisms, failed to develop tuberculosis even when allowed to live for two months.

The allergic tests were interesting. All six cows were tested intradermally both with a streptothrichin, prepared from *Streptothrix nocardii* grown for five weeks on 4% glycerin bouillon and prepared after the manner of Koch's O. T. and used in 20% strength, and with a 50% dilution of avian tuberculin (the latter kindly furnished by Dr. Van Es). Cows 1, 2 and 5 gave distinct reactions to the avian tuberculin, while cow 3 gave a doubtful reaction. Case 1 gave an equally strong reaction to the streptothrichin, while cases 2 and 5 failed to give a decided reaction to this test. Cases 4 and 6 failed to react to either of these tests. Cases 1, 2 and 3 were ophthalmically tested with streptothrichin and case 1 again gave a marked reaction, while the others were negative. Cases 1, 2, 3 and 4 were tested with ordinary veterinary tuberculin, 1 and 2 being tested subcutaneously with 10% O. T. and the others intradermally with 50% O. T., and the results were negative in all cases. All four were then given the ophthalmic test for tuberculosis and again the results were negative.

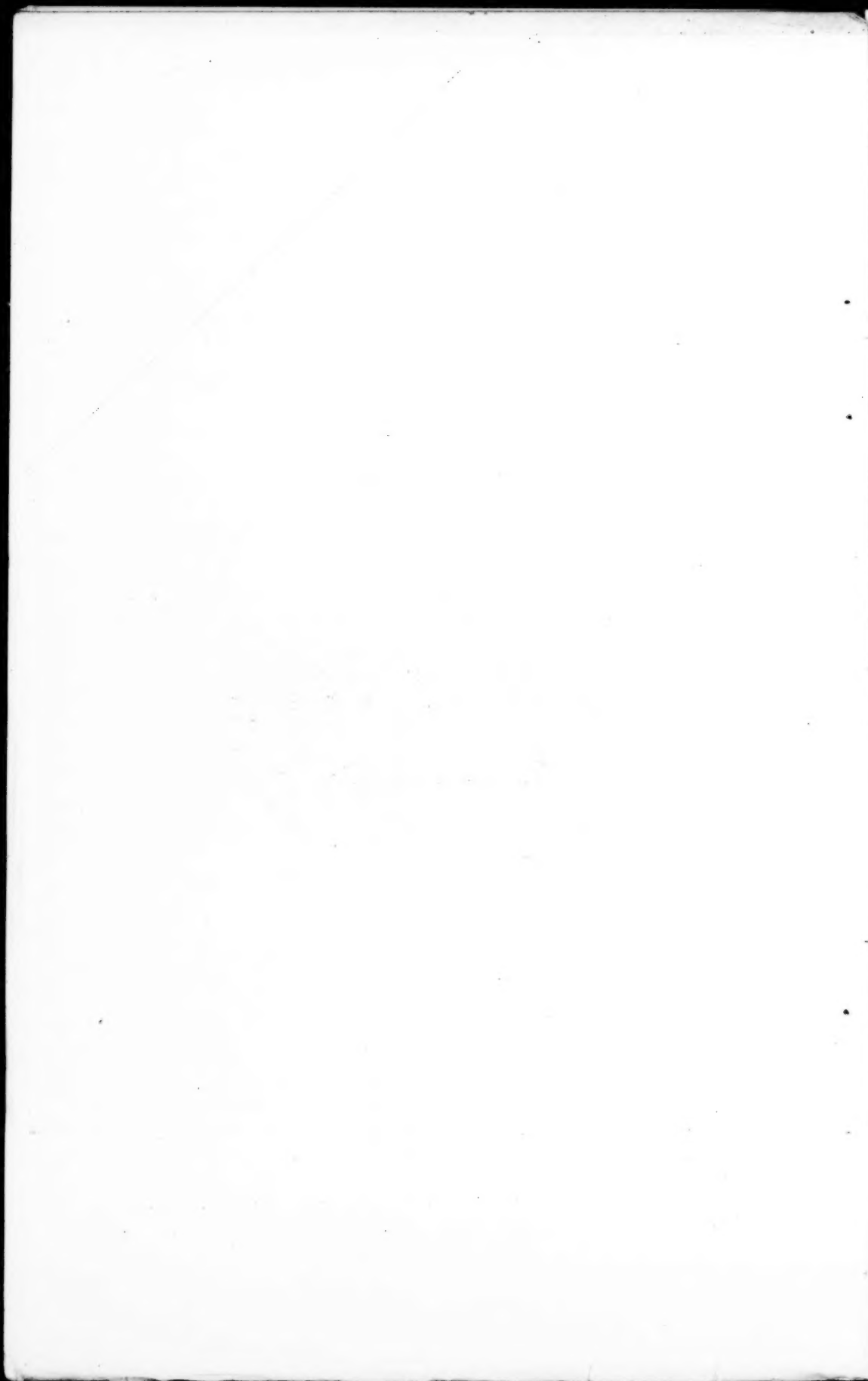
The failure of the animals to react to streptothrichin, while reacting to avian tuberculin, may be partly explained by the fact that the former was used in weaker dilution and was prepared hurriedly and was probably not as active as the avian tuberculin. The reactions indicate, however, that the causative agent belongs to the group of acid fast organisms more closely related to the strepto-



Case 1



Case 2



thrix than are the mammalian tubercle bacilli. The failure thus far to grow the organism and the reaction to avian tuberculin also suggested an organism very much like the one responsible for Johne's disease (*Enteritis paratuberculosis*). The usual clinical manifestations of this disease, however, have never been found in either of these herds.

Further studies and a more detailed record will be published later.

—o—

A TWO HEADED CALF

W. G. HUYETT, Wernersville, Pa.

A monstrous foetal calf was delivered, by me February 27th, from an eight year old grade Holstein cow, with two fully developed heads, each having a separate neck, uniting posteriorly to form a



single body. The foetus was about seven months old and had died *in utero*, about two days prior to indicating symptoms of abortion. Posterior presentation with both hind limbs flexed at hocks. The mother had twins two years previous.

—o—

A THREE CHAMBERED HEART IN A HEIFER

PAUL RUNGE, Newark, N. J.

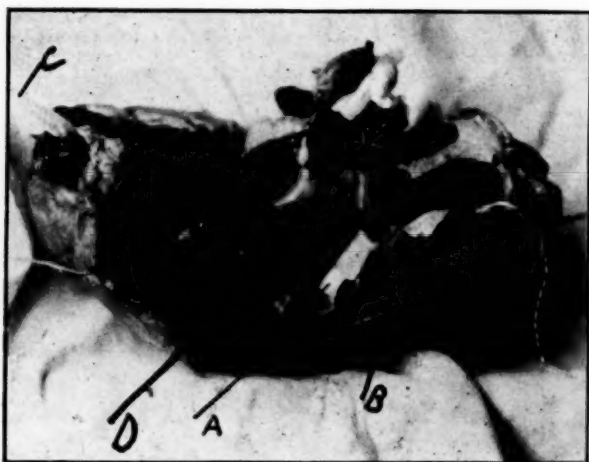
Of all the organs which help to make up the anatomy of an animal the heart receives the least attention upon postmortem by the average practitioner. This being due perhaps to the small

number of heart diseases and abnormalities found in animals.

This condition of two auricles and one ventricle in the same heart was found in a pregnant heifer which was killed for food purposes; the animal being in good condition.

No temperature was taken; neither was the frequency of respiration or pulse noticed but no doubt this heart would have been a very interesting one to auscult.

My attention was first drawn to this condition by the fact that



it was much larger than the normal heart, and by the fact that its shape was greatly altered, the apex being rounded instead of pointed and the anterior straight and posterior concave borders were both convex, in fact the heart appeared more like a ball than like a cone.

I opened the heart through what I thought was the wall of the left ventricle from about two inches above the apex, cutting upward through the middle of the auricle and much to my surprise I noticed that both atrio ventricular orifices opened into the same chamber. Further examination showed that there had been no second ventricular chamber and that the ventricular septum was absent. All other structures such as the mitral, tricuspid and pulmonary valves were all normally present.

In the above illustration letter A shows the lower end of a piece of gauze through the aortic orifice, letter B a piece of gauze through the left auricle, letter C a piece of gauze through the right auricle, and letter D shows the single ventricle.

A CASE OF THROMBOSIS

JOSEPH A. DEGRICOT, Mendham, N. J.

On February 27th, 1916, I was called to see a chestnut mare of about 23 years of age, with a peculiar history. After asking a few questions from the owner, (who was a lady), I suggested that I hitch the mare up and drive her, so as to bring out the symptoms.

After I had driven about a mile, the mare stopped, held up her right hind foot, and trembled. I then turned her around and started for the house, but before I reached there, I had to give the mare several rests for when urged to go, she would almost touch the ground when she put any weight on that foot. She broke out in a sweat, the water running from her in streams.

It was all I could do to get the mare unhitched and take the harness off before she was down. She tossed and rolled, got up and drew up her foot, then lay down again.

I examined the limb and found it a great deal colder than the others. In about a quarter of an hour she was standing and acting normally again.

I then asked the owner how long the mare had been acting this way. She told me for about a year or so the mare hadn't the life which she had always had, and that for the past couple of months she had acted just as I had told her the mare had acted with me.

A diagnosis of a "Thrombosis" was made. As the animal was so old I advised its destruction which I made three days later.

Upon post-mortem I found an antemortem clot in the right branch, about an inch from where the posterior aorta bifurcates, which almost entirely filled up the artery. The major part of the clot weighed a little over four ounces and extended into the several branches.

MACERATION AND DECOMPOSITION OF THE FETUS IN MARES

S. R. HOWARD, V.S., Hillsboro, Ohio.

I believe that all trustworthy veterinarians have a just right to the inheritance of the experience of their predecessors.

This is a gangreno-neerotic process, or in simpler words, is a rotting of the fetus due to the hindrance of its expulsion. The hin-

drance may be one of a great many that occasionally are present, but this hindrance is never complete, for air must enter the womb else we would have mummification.

I wish to refer more especially to this condition occurring after the normal time of parturition in the mare alone. Fleming states twelve cows to one mare is the relative proportion of cows to mares in this trouble. Standard works refer to this particular subject in a very painfully guarded and limited manner, confining most of their study to the cow. The contemplation, or even the remembrance of such cases in one's practice is anything but an Elysian dream. I have often wondered if this was not the reason why so few mare cases are recorded, and perhaps another reason is that most all mares so afflicted die. Why all such cases do not die of metritis and putrid infection, to me, is one of the greatest wonders of nature.

It is well known to those having had extensive experience, that some mares when endeavoring to expel the fetus, will strain, struggle violently, and persistently for perhaps only a short time, and are not seen to strain again unless manipulated. These are the only kinds of cases I especially wish to refer to. Their limited and ineffectual straining is sometimes passed unnoticed by the attendant, and the case may be one where partial or complete obstruction to foaling is present. Then, sometimes even the careful attendant might believe the colt was stolen, lost, devoured or that it was a case of "false conception" (whatever that may be). In all my experience I have never delivered but one live colt where an hour or more had elapsed from first signs of straining.

The mare is alone and attempts to foal. The fetal membranes are ruptured and separated from the face of the womb, the liquor amnii escapes, the os is dilated, air enters, and the colt usually smothers, and dies at once unless quickly expelled or delivered. If not delivered, as a rule the wretched mare is then doomed to a miserable death, or a suffering and pitiful existence until she is relieved.

Of course to the fetus, emphysema occurs in a very little time after death under such circumstances. This is the period when the obstetrice is often called, and when the introduction of the hand is difficult if not almost impossible owing to the bloated condition of the fetus, dryness and congestion of the womb.

In my obstetrical bag, as the M.D.'s say, I carry instruments in a roll, a sleeveless coat, a pair of overalls, pump, bottle of antiseptic, a pair of rubber gloves, and last but not least a dusting can of powdered slippery elm. I like it better than oils or grease. With warm water an emollient emulsion can be quickly prepared and injected. Use plenty. To slightly powder the dampened arm and hand is good practice.

Rubber operating gloves (they are cheap) should always be worn when manipulating in such cases. Neglecting this precaution upon two occasions, I have almost lost my life from infection. To care for the gloves when not in use, I cover them inside and out with corn starch and keep them in a very shallow, full length box.

I can not see how a veterinarian in general practice can be surgically clean but I do claim we should always try to lessen our danger to infection.

These cases are not in the least alluring, and the obstetrict must not approach them in haste and overconfidence. He should have physical endowments not to be sneered at, a stout heart, a long arm; he should not be hungry, wet or cold, and as Fleming states, "he must be gifted with presence of mind, coolness and fertility of resource so as to take in all the circumstances of the case, devise his method of procedure and carry it out promptly."

I know a little, lithe Irishman who has quite a reputation as an obstetrict in a cattle raising neighborhood. While he is uneducated, yet rather intelligent, he has proven himself a valuable acquisition to the district. He has never used an instrument of any kind, save some small ropes. He has powerful arms and fingers, is active and resourceful. He informs me, in some cow cases he has used his bare foot and leg as a repeller while laying hold of root of tail of the cow. I have never before read or heard of such a repeller, but I have heard of a number of cases where he used his small naked foot successfully.

Of all the foul, stinking, dangerous and disgusting operations we are called upon to perform I believe the treatment of cases of maceration is beyond compare. Some such experiences of country veterinarians would challenge credulity. It is taught that when liquefaction has taken place the prognosis is more favorable. This I think to be true, but very few mares live to that stage.

In time the bones of the head become disconnected, the epiphysis and diaphysis separate and all the bones more or less disconnect,

the soft structures liquefy, and the horrible death-stench discharge usually takes place, alongside of which a polecat is a refreshment. The internal face of the womb exudes a muco-purulent discharge which further adds to the softening of the festering mass.

After carefully reading what literature is available to me on this subject, I can not see that I can add to it much of value, save to state that in some cases considerable force even with a hoist will be necessary to take away the ribs, vertebrae and pelvis. These bones seem to be the last to disconnect from each other.

As an illustration, this case may be interesting:—

"Nell", fat four year old, 1600 lb. brown mare, due to foal April 2, 1912. Owner, William Aitkin. Mare worked on farm regularly before, during and after foaling time to July 9th, one week and three months past due. At foaling time she had the usual premonitory symptoms of readiness to foal, but no one noticed any restlessness, straining, discharge, signs of having labored or struggled, nor any acute signs that the event should take place. She was looked at several times each night for a week or more, but each time she seemed all right. The owner, an experienced horseman and extensive breeder, then supposed the colt had been lost in a large pasture, as no trace of it could be found.

An observing and careful man continued to work her, watching her narrowly all the while, she retaining her usual good spirits and flesh, but finally lost her milk and shrank in abdominal girth. The owner consulted me several times in the three months and without seeing the case, I each time ventured the opinion that she still retained the fetus. Owner not assenting to a visit, the mare was left to expectancy. No odor or discharge was at any time noticed. This I can not understand. She came in heat regularly, and was served by the owner's stallion five days before I was called, July 10th.

DeBruin states that oestrus may occur regularly with such patients, and that conception is possible. This, I grant, is true but judging by the paucity of the records of such cases, conception must be extremely rare. Over three months beyond time of foaling the mare came out of the barn to go to work, having symptoms of slight laminitis. I was called. Ignoring the laminitis, I found upon exploration, the womb open and a transverse dorsal presentation of a slimy and bony vertebral column. In such cases if weather permits, I remove all my clothing, and don a suit of overalls. It

required several hours to carefully remove the remains which consisted of bones, and several gallons of corruption or completely disorganized tissue of about the consistency of soft soap, plus the usual stench.

It demanded the assistance of three strong men with a hoist to pull away the vertebral column and pelvis. The womb was then injected with a large tubful of warm antiseptic and deodorizing water. I then used a large tubful of the same on myself, and went to dinner. After dinner we gave her another, but smaller uterine injection, swabbed her feet and left. The next day she was doing well, save having a rather severe case of metastatic laminitis, which in spite of care and rest, lasted until late in the fall, leaving her with slightly ramy hoofs and almost inconsiderable chronic founder. She was given another large injection and released to the owner's treatment.

She is now in splendid condition and has been frequently bred, but up to the present has not conceived. She was very well sold lately at public auction and is a very serviceable animal, all of which is a source of considerable satisfaction to me.

BETTER STABLE CONDITIONS FOR COWS. In an article in the *Lancaster Daily New Era*, Lieutenant-Governor Frank B. McClain calls the attention of the Eastern Pennsylvania farmers to the necessity of different housing conditions for their cows and steer cattle, and if better housing conditions are not provided, the "freight" will have to be paid by the person who refuses to recognize this necessity.

The reason why Virginia cows and Western cows and even Northern Pennsylvania cows have the preference is because in the carcass very few of them show evidence of tuberculosis. The explanation of the healthier condition of this class of cows is that they have more outdoor life in day time throughout the entire year, and at night time, in the winter, are not housed in air-tight barns. It therefore behooves the farmer to give some attention to better barn ventilation as a preventive of tuberculosis among his cows and steers, otherwise he will find it expensive when he comes to dispose of his live stock.

ABSTRACTS FROM RECENT LITERATURE

STRYCHNINE POISONING IN A DOG. Henry Taylor, F.R.C.V.S. *Veter. Jour.*—A fox was poisoned with strychnine. A dog came home with the head of a young rabbit in his mouth. His abdomen was distended and full. Had he partaken of the poisoned fox? After remaining quiet for six hours, he suddenly got out and had a fit which soon passed off. Attempts to give him a dose of castor oil failed and a small pill was offered in a bit of meat. He took it. After an hour, he developed the characteristic symptoms of strychnine poisoning. Chloral hydrate and bromide of potassium in large doses were prescribed. Fit after fit continued but chloral was still administered until after some time the next morning after a series of attacks he was finally awakened from the apparent sleep he was in. He then looked drowsy but gradually improved and got over all his troubles. The interest in this case rests on the length of time which had elapsed between the partaking of the poison and the onset of the first fit, *six hours* and the recurrence of the fits while the dog was under the influence of the antidote, viz: large doses of chloral.

A. LIAUTARD.

IS LEUCOCYTOZOON ANATIS THE CAUSE OF A NEW DISEASE IN DUCKS? Wickware, A. B. *Parasitology*, 1915, June, Vol. 8, No. 1, pp. 17-21.—(The paper is of considerable interest in the light of recent enormous outbreaks of a fatal disease among ducks in California (Tulare Lake, etc. and Utah.)

The author studied an outbreak at a poultry farm, where heavy mortality prevailed. The malady ran a rapid and fatal course. The prodromal symptoms were very slight. Some died in the first attack, others after several exacerbations. The birds lie in a semi-comatose condition, but, if aroused, undergo remarkable contortions of the head and body. They lose the power of controlling equilibrium. The recovered birds are stunted and undersized. The mortality is 65-70 per cent.

Leucocytozoa (*L. anatis*) were found in large numbers in ducks in which the infection ran an acute and fatal course. Transmission experiments were successful in one instance only.

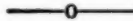
The author is not prepared to accept the Leucocytozoon as the causative agent of the disease, but he gives reasons for its probably being the excitant and for the failure to transmit the parasite. The paper is well illustrated.

K. F. MEYER.

ENORMOUSLY ENLARGED PROSTATE ABSCESS IN A DOG. Arthur Payne F. R. C. V. S. *Veter. Journ.*—Half bred collie, eleven years old. For three months he had been losing flesh, and yet had a good appetite. He passed a small quantity of urine, which was occasionally tinged with blood. One day he had more difficulty in micturating and from that day refused all food.

On examination per rectum, the enlarged prostate gland was detected. The bladder was congested, and engorged. The dog looked very sick, yet when he was called, he came and urinated freely. Urotropine was prescribed. Finally the poor sufferer died a natural death. At post mortem, one and one-half pint of urine was found in what was taken for the bladder. On the right side of this sac, was one that proved to be the true bladder. The prostate was hypertrophied. The second bladder which was the normal organ, showed that the first sac had been made by the giving way of some muscular fibres, which had let the vesical mucus pass through and allowed the formation of a pocket, a diverticulum of the bladder.

A. LIAUTARD.



SUR LA CULTURE DU PARASITE DE LA LYMPHANGITE EPIZOOTIQUE, (The Culture of the Epizootic Lymphangitis Microorganism). Nègre L. et Boquet A. *Bull. Soc. Path. exot.* VIII. 1915; 10 fevr.—By inoculating the water of condensation of glucose agar and incubating the tubes at a temperature of from 24 to 26 degrees C., the authors have succeeded in growing the *Cryptococcus farciminosus*. The culture was very adherent to the medium and consisted of mycelia and irregularly shaped bodies, varying in size from 4-6 μ . Subcultures were successful.

(The reviewer isolated, in 1912, an organism from typical pus collected from a case of epizootic lymphangitis in Jamaica, which corresponds in every detail with the organism described in the preliminary note given by Nègre & Boquet.) Inasmuch as Dr. Bridre (from the Institut Pasteur in Mustopha, Alger) stated, in a personal communication, that at the time of writing—1912—they had not been able to cultivate the *Cryptococcus*, the reviewer considered his organism to be a contamination.

For further information see K. F. Meyer,—Epizootic lymphangitis and sporotrichosis. (Studies on American Sporotrichosis II). *American Journal of Tropical Diseases and Preventive Medicine*. 1915; September; Vol. III; No. 3; pp. 144-163.) K. F. MEYER.

L'OFTALMO E L'INTRAPALPEBRO-REAZIONE NELLA DIAGNOSI E NELLA DIFFERENZIAZIONE DI ALCUNE TRIPANOSOMIASI. NOTA PREVENTIVA. (THE OPHTHALMIC AND INTRAPALPEBRAL REACTION IN THE DIAGNOSIS AND DIFFERENTIATION OF TRYPANOSOMIASIS. PRELIMINARY NOTE.) Lanfranchi, Alessandro. *Bull. Soc. Path. Exot.*, 1915, Mar., Vol. 8, No. 3, pp. 112-115.—It is frequently impossible to diagnose clinically the various trypanosomiasis of animals. With the object in view of finding a simple and certain method of diagnosis, the author made experiments using the ophthalmic and intrapalpebral reactions.

Dogs and horses with surra were employed, healthy animals served together with those infected with *T. brucei* as controls. Antigens were prepared from extracts of *T. evansi* in water, alcohol, glycerine, ether and chloroform. The technique was similar to that used in the case of animals infected with glanders and tuberculosis.

The conclusions are: using a glycerine or alcoholic extract of infective trypanosomes, it is possible by means of the ophthalmic reaction not only to diagnose surra in the dog, but to distinguish this from other trypanosomiasis.

In horses similar results were obtained. The diagnostic value of a slight rise in temperature from the intrapalpebral test during an afebrile period in infected horses has still to be determined.

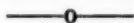
(It would be advisable to investigate the value of this test in cases of dourine).

K. F. MEYER.

CAECAL ADMINISTRATION OF DRUGS. Doct. A. Bouchet. *Rev. de Pathol. Compar.*—The author proceeds as follows: A horse has colic. Whether tympanitic or not, tincture of iodine is applied to the right flank, in the region where the aseptic trocar is to be introduced. The puncture is made. The blade of the instrument is withdrawn and the canula of the instrument left in place, the mouth of a 10 centiliters syringe is introduced, carrying the drug, which is to be introduced. The injection can be renewed as often as the quantity of the solution requires, the canula of the trocar being left in place even if the animal is restless or while he is walking. Of course, if there is tympanitis the gases are allowed to escape first of all.

By this method, the author has often given tincture of opium chloral, and ether, separated or mixed and has relieved almost immediately animals which were suffering with very violent colic.

He has given in one day 50 grammes of chloral and 80 of ether and obtained complete anesthesia, which lasted 25 minutes. The author has advocated this mode of administration because of the difficulties which some times accompanied the giving of drugs in solution where given per mouth or per rectum. A. LIAUTARD.



Field Marshall von Hindenberg's letter of appreciation of the services of the veterinarians in the German army appeared in the *Tierärztliche Rundschau*, Oct. 1915, p. 357:

September 20, 1915.

From the reports submitted it appears that since the beginning of an organized campaign in April of this year, aimed at the eradication of glanders and contagious pleuro-pneumonia, diseases most dangerous to horses and to the troops dependent upon them, an extraordinary and permanent suppression of the epidemics has been accomplished. These services of the field veterinary corps rendered in the strongly infected Russian field of operations under adverse conditions are the results of a specially broad and self sacrificing sense of duty. I am given all the more occasion to express my appreciation of the successful suppression of epidemics because the veterinary corps has also rendered signal services among the troops, veterinary hospitals, military abattoirs, and in other field operations; especially in the preservation and replacement of the valuable supplies for horses. These circumstances give assurance that in spite of the military campaign in an infected country, with an energetic and foresighted prophylaxis and eradication of equine diseases, especially those that are contagious; the losses in difficultly replaceable horses will not exceed the unavoidable losses incident to forced marches and irregularities in feeding.

(signed) *von Hindenburg.*

Note by Abstractor. The above letter of General von Hindenburg should be of special interest to veterinarians in view of the bills now pending in Congress. These bills provide that the United States Army shall have a Veterinary Corps somewhat similar to those already in service in Europe, and that the veterinarians in the army shall have the RANK, pay, allowance, etc., of officers. In other words, that they shall have rank, which they previously have not had.

BERG.

PSYCHICAL TRAUMATISM IN A HORSE. Mr. L. Lepinay. *Rev. de Pathol. Compar.*—Seven year old gelding, returned from the front, in the infirmary of wounded or over worked horses. He was closely examined and presented nothing abnormal. He had no wounds, no elevation of temperature, was in quite good condition, was lively, trotted and galloped easily. He was perfectly quiet. *Why was he returned?*

Watched at feeding time it was noticed that he could not take his food from the ground, nor even from a low manger. Finally he knelt down and reached it.

The mouth, throat, ears, neck, anterior quarters, vertebral column were again examined. Not the slightest lesion superficial or deep could be detected. At each feeding time, he tried to take his ration, hesitated, made some attempts and finally spread his fore legs apart, knelt down with a groan and began and completed his meal in that position.

After a few days, he gradually improved but it took four or five weeks for all the symptoms to gradually subside and disappear. As he was an artillery horse and in the midst of cannon thunder, the question may be asked, did he get a nervous shock?

A. LIAUTARD.

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Intravenous Injection of Chloral Hydrate for Operative Purposes. Martens. *Zeitschrift für Veterinärkunde*, Vol. 27, p. 302, 1915. A solution of 50 grams of chloral hydrate in 400 cc. of water is used. The casting of the horse is brought about very easily by this method; the injection is stopped when the horse begins to sway. The narcosis is sufficiently deep. Undesirable after effects were not noticed.

BERG.

—o—
TUMOR IN THE URINARY BLADDER OF A MARE. Susman. *Berlinger Tierärztliche Wochenschrift*, Vol. 31, pp. 461-462, 1915. I was called to examine a horse which had passed large quantities of blood and blood clots during the past two months.

Examination—Mare, over 12 years, emaciated and apathetic. External genitalia somewhat swollen and bloody. The urine received in a container was blood colored and contained clots, some as large as the palm of a hand, others as thick as a finger. There was no sediment from which information could be obtained regarding the cause of this abnormal condition. Rectal examination of the bladder

showed it to be as large as a man's head, tightly filled and pressed backward toward the anus. This diminished the lumen of the rectum and caused an accumulation of gas and feces on the oral side. The horse was raked to permit closer examination. Slight pressure on the bladder was painful and caused the evacuation of several liters of urine, at first red, later yellowish. After the bladder was emptied in this way, a large compact mass could be felt through the rectum, the significance of which was not apparent at first. A closer examination of the vulva and palpation of the vagina and os uteri disclosed nothing unusual. Catheterizing was easy, a finger could be easily introduced into the urinary meatus. This caused the mare to groan and strain, and some blood was passed. In this way it was found that the swelling was on the ventral surface of the bladder. The swelling was hard, like a cauliflower, and extended from the neck to the fundus of the bladder. A limited mobility indicated the presence of a neck or stalk by which the tumor was attached.

Diagnosis: Tumor of the bladder was highly probable. I attributed the hemorrhages to the rupture of capillaries caused by the distension of the bladder by the retained urine. This in turn could be caused by the movable tumor blocking the internal urethral orifice.

Treatment: Although I informed the owner that permanent cure could be brought about only by surgical treatment, and recommended slaughter, he requested that medical treatment be tried. I prescribed irrigation with 3% alum solution and daily doses of potassium iodid, 5 grams. As might be expected there was no improvement, and as a last resort the owner consented to surgery.

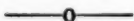
Operation: This was performed on the horse in the standing position, after rectal administration of chloral hydrate. The urinary meatus was stretched until two fingers could be passed through. I looked for the stalk of the tumor and found it. It was as thick as a small finger, and attached to the ventral surface of the bladder, about 3 centimeters from the internal urinary orifice. With the aid of the ecraseur, the stalk was cut and hemorrhage stopped with a 'Thermocauter'. Healing took place promptly and after effects have not yet been observed. Histological examination confirmed the diagnosis of tumor.

BERG.

INTUSSUSCEPTION IN THE HORSE. P. G. B. *Veter. Record.*

—A six year old cart gelding had always done good work, had no illness and was in very fair condition. He was in the care of a careful and good driver. Returning from a journey, he showed slight abdominal pains, and got a colic draught. Relieved for the night, the next morning he was off his food, had a temperature of 102° F., cold extremities, ears and legs, his breath was short and he occasionally laid down. He remained in that condition for a few days, then stopped eating entirely but manifested great thirst. He took water heartily. After a day or two he had a fetid odor from the mouth and a peculiar gurgling sound was heard at the base of the neck. A diagnosis was made of abdominal abscess due to external injury. Prognosis unfavorable. The patient gradually lost ground. Violent purging set in. The animal, in walking, had a peculiar rambling gait. The illness lasted ten days and finally the horse was destroyed. The post mortem showed intussusception of the cecum within the large colon. The whole of the organ was drawn in and between the walls of the two bowels there was about a gallon of pus.

A. LIAUTARD.



THE LIFE HISTORY OF GONGYLONEMA SCUTATUM. Brayton H. Ransom and Maurice C. Hall. *Journ. Parasitology*, v. 2 (2), pp. 80-86.—*Gongylonema scutatum* is the gullet worm of sheep and cattle, a parasite very common in these hosts in the United States and resembling a thread sewed in serpentine fashion in the mucosa of the esophagus. It has been found that the eggs produced by the female worms in the gullet pass out in the manure and are there ingested by the small dung beetles of the genera *Aphodius* and *Onthophagus*, either while the beetles are in larval stages or when adult. The larvae from these eggs develop in the beetles to an infective stage and the beetles are ingested by sheep and cattle in grazing over fields where these insects are making their flights from one manure deposit to another. As the beetles land on grass or other vegetation and start to crawl toward a manure deposit, the vegetation through which they are traveling may at that moment be eaten by sheep or cattle and it is a matter of common knowledge that these animals do not stop to sort out such miscellaneous objects from their food. The nature of this life history has been demonstrated by feeding dung beetles and the *Gongylonema* larvae, which are of fairly common occurrence in these beetles, to experiment

sheep, and the subsequent demonstration of the adult worms in the sheep. It has also been shown that the larvae will develop in the croton bug and that larvae developed in this intermediate host will infect sheep when fed to them.

In this connection, attention is called to the work of Fibiger and Ditlevsen who have found a similar worm, which they call *Gongylonema neoplasticum*, in rats, and which appears to be communicable to rodents generally. *G. neoplasticum* occurs in the squamous-celled epithelium of the anterior portion of the digestive tract, including the mouth, tongue, esophagus, and fundus of the stomach. In these regions the worm gives rise to a proliferation of the epithelial elements, originating as a circumscribed or diffuse hypertrophy with a slight inflammation, going on to the formation of papilloma, and terminating in distinct carcinoma with occasional metastases. This parasite has its intermediate stages in croton bugs, cockroaches, and mealworms. The fact that it bears some etiological relation to the production of cancer is a fact of considerable scientific and medical interest.

It is also noted that the worm commonly known as *Spiroptera obtusa* from the stomach (the authors have inadvertently stated that this worm occurs in the intestine) of rats, mice, and other rodents, has a somewhat similar life history, the larvae developing in the mealworm. The feces of the rodents parasitized by these worms are eaten by mealworms and the mealworms in turn eaten by the rodents.

M. C. HALL.

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TREATMENT OF MANGE IN ARMY HORSES. Prof. Coquot. *Bullet. de la Soc. Cent.*—Having a large number of mangy army horses to prescribe for, they were divided and classified according to the condition of the disease, into three groups: 1—those where the mange was isolated; 2—those where it was well localized; and 3—those where it was general, that is covering a great surface of the body. The three groups were kept separated and out of doors night and day. All the animals had first a free soaping followed by energetic brushing, until the skin was cracking and blood oozing. An exposure to the sun with walking dried the animal which was then ready for the anti-parasitic application.

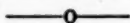
To those of the first group the treatment consisted in washing with sulfurous solution and the application of Helmerie ointment.

To those of the second group, the same washing, the applica-

tion of an ointment made of oil, petroleum, benzine in equal parts to which were added soft green soap and sublimed sulphur also in equal parts and sufficient in quantity to make a soft paste. The application dried rapidly on the surface and was left for two days when a general washing removed it.

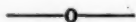
The same treatment was also applied for the animals of the third group. Half of the body being treated first and the other later.

Recovery was obtained rapidly in nine-tenths of the cases. An average of from 10 to 20 days being required to obtain it.



TUBERCULAR MENINGITIS IN A COW. J. Bourwan. *Vet. News.* The cow was six years old and had a calf 18 months before, coughed only lately. She had been alternately dull and excitable. For eight days she had been standing with the head elevated and carried rather on one side. She ate some, swallowed easily and gave a small quantity of milk. Such was her previous history.

She was emaciated, lay on her bent knees and was unable to rise. The head was elevated and carried on one side, the eye-balls were in an oblique position, there was no nystagmus, the cow had now and then clonic convulsions in the limbs and she was very excited. The next day she was stretched out full length, the head still in the same condition, clonic convulsions were very frequent. She died in the evening. At the post-mortem, the diagnosis of tubercular meningitis was confirmed. The pia mater at the base of the brain and of the hemispheres was infiltrated and presented a compact mass of tubercles about the size of a millet seed. In examining the thoracic cavity the peribronchial and mediastinal lymphatic glands were found the seat of calcified centers and some of them with purulent foci.



AMPUTATION OF PROLAPSUS RECTI IN A PONY. Dr. A. A. Feist. *Alpha Psi Bullet., Vol. I, No. 4.*—The case was well characterized, reduction had failed and a very grave prognosis was offered. Amputation was the only chance of saving the animal. It was performed as follows:

The colt was narcotized with the injection of 20 minims of fluid extract of cannabis indica intravenously. Chloride of adrenalin was injected in the tissues at the seat of operation. The colt was secured, the seat of operation rendered aseptic as much as

possible with solution of kresol, and two hat pins were introduced at right angles to each other at the base of the protruding rectum. A half ounce hard rubber syringe was introduced into the rectum up to the point where the bowel was to be ligated. This was done to support the inner wall of the protruding part and making the ligation more effective and the suturing easier. The part ligated, a circular incision was made two and one-half inches from the base. After the protrusion was removed, four sutures were placed in the ends of the bowel, at even distance and four more were placed between these. Silk sutures were used. The ligatures were gradually released and the hat pins removed. A truss was placed immediately, in the shape of a figure 8 running round the body and neck and back under the tail. Local treatment with rectal injections of kresol, careful diet and later tonics brought a complete recovery in two months.

A. LIAUTARD.

ANTHRAX FROM SHAVING BRUSHES. Some time ago, in London, several cases of anthrax were traced to infection from shaving brushes. Investigation disclosed that a consignment of brushes belonging to the same lot had been sent to Glasgow. By direction of Dr. A. K. Chalmers, Medical Officer of Health of the City of Glasgow, this lot was promptly secured and withdrawn from sale as far as possible. The lot numbered 324 shaving brushes, and of these 280 were collected and examined. According to a letter just received from Doctor Chalmers, "the bacillus of anthrax was isolated from the hair taken from a group of ten brushes (in two boxes) which had reached the shop of a retailer. The bacillus was found to possess the degree of virulence which it ordinarily exhibited on isolation from cases of anthrax.

These findings are of extreme interest and indicate a source of infection of anthrax which should not be overlooked. Some months ago, the Department of Health examined brushes on the market, and found no anthrax in any of them. Moreover, it was learned that the method of manufacture, as at present carried on in this city, precluded the probability of any infection from this source.—*Weekly Bulletin of the Department of Health, City of New York.*

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 133)

PRESIDENT MARSHALL: I would be very glad to have somebody make a definite recommendation along this line.

DR. HOSKINS: Mr. Chairman, I am prepared to make one if no one else is and that is, that a committee composed of five members be selected to be known as the Salmon Memorial Committee and that they shall be appointed for a period of five years. In the event of death or resignation of any member of that committee, of course the president would have the power to fill any such vacancy.

PRESIDENT MARSHALL: That they be appointed by the incoming president?

DR. HOSKINS: I leave that entirely as a matter for the association. The in-coming president or the present president, whichever is decided. Seconded by Dr. Schneider.

PRESIDENT MARSHALL: The motion has been made and seconded that a committee of five to be known as the Salmon Memorial Committee be appointed to serve for five years.

DR. HOSKINS: To be appointed by the present president.

PRESIDENT MARSHALL: I didn't understand that was included in the motion.

DR. KINSLEY: Make a permanent committee rather than a five year committee, having one new man appointed each year.

DR. DUNPHY: I have a suggestion to offer in regard to this matter, in order to keep that committee and to continue it, that we appoint a committee of five to serve three years. At the end of three years, let a member of the committee retire each year, and another member of the committee be elected in his place, that would keep a permanent working committee, familiar with the conditions all the time. It would be possible to appoint a committee of five to serve for five years and it would be possible at the end of that time to have an entirely new committee. I believe if we carry that committee for three years and at the end of three years, let one or two retire, one for instance and each year fill the place with a new man, either to be reappointed or selected, that this would give the committee a certain amount of permanency and would not make a radical change.

DR. KINSLEY: Mr. President, I move as an amendment to the original motion that this committee be a permanent committee of five, the term of one to terminate in one year, two years and so on down so that one man could be appointed each year.

DR. FAUST: Mr. President, that would mean one man is appointed for five years, one for four years, one for three years, one for two years and one for one year and each year there is a new man on the committee. I second that amendment.

DR. HOSKINS: Mr. Chairman, I accept that amendment. I think Dr. Kinsley's suggestion is a good one. One member for one year, one for two years, one for three years, one for four years, and one for five years, which gives the in-coming president an opportunity to re-appoint the retiring member if all members of the committee have fulfilled their duty.

DR. H. C. MCCAIN: The point was not settled in the motion of Dr. Hoskins as to whether or not the present president or the in-coming president would appoint the committee to start with. Speaking on that subject, I would be strongly in favor of the in-coming president appointing that committee, giving him the same opportunity as each succeeding in-coming president would have. In Dr. Hoskins' original motion, it was not stated which president would appoint the committee.

DR. KINSLEY: I think we had better dispose of the organization of the committee first and then appoint them afterwards.

DR. DANIELSON: In that this is a committee lasting for five years with five members in rotating appointment or selection, I suggest as an amendment to this motion that the present president appoint three members of this committee and the in-coming president the remaining two members. I really think that the selection should not be entirely left to one man. It is a committee of lasting endurance and importance and I think both the out-going and in-coming president would be willing and I think that the association would be willing to see them divide the responsibility of the selection of that committee.

PRESIDENT MARSHALL: Is not that suggestion out of order just at present? What we want to do now is to select the committee as suggested in the motion and then later say who is going to make the appointment.

DR. DANIELSON: I thought there was a doubt in our minds about it.

PRESIDENT MARSHALL: This is an open question to be decided by this body later. With that understanding, gentlemen, are you ready for the question? All in favor of having the committee appointed, as Dr. Kinsley put it, signify by saying "aye", opposed the same. The "ayes" have it; it is so ordered. Now we would like to hear how this committee shall be appointed and by whom it shall be appointed.

DR. DUNPHY: In view of the fact that this is an important matter and there will be a member of this committee elected every year, I move that the association select this committee. Seconded by Dr. Faust.

PRESIDENT MARSHALL: It has been moved and seconded that the committee be selected by the association. Any remarks?

DR. MCCAIN: Mr. President, I rise for information. If there were only five men elected, which one would serve five years and which one year?

PRESIDENT MARSHALL: The one receiving the largest number of votes would serve for five years, the next largest for four years, and so on. How would that do?

DR. NEWSOM: I cannot say that I fully approve of that suggestion. There are a number of younger men here, men who are younger in the association than myself and I would not feel competent to vote upon the names to be

presented for that committee. I feel sure that many of these older men who knew Dr. Salmon well and the men who were intimately associated with him would be much better prepared to select that committee, than this body alone. I would offer as an amendment to this motion, that we vote upon the names as recommended by the executive committee.

DR. FOX: Mr. President, it seems to me we are taking a large job on our hands and that it is unnecessary to vote on four or five men to act as a committee. Suppose we take the presidents for the last five years—and let them constitute this committee. At the end of each year, let our retiring president take the place of the one who would drop out. There would be no appointment, they would be elected by the association. When they elect a president they know he will take the place of the president that retired five years ago. Make that a continuous committee along that line, the last five presidents acting on the committee.

DR. RUTHERFORD: The serious objection to that is, that it leaves out Dr. Hoskins.

DR. FOX: I beg Dr. Hoskins' pardon, I had not considered that. I will withdraw that suggestion.

DR. HOSKINS: I am not taking that matter into consideration but there is one man who ought to be on that committee and that is Dr. Melvin, who has taken a great deal of interest in the matter and that great body of men in the Bureau, the employees of the Bureau of Animal Industry are deeply interested and Dr. Walkley has taken a deep interest and is ready to move whenever we say what direction the movement shall take.

We ought also to have a man from Canada. I am willing to work in the ranks. I don't wish to be on the committee at all. I will take as much interest working in the ranks as though I were a member of the committee but I will act upon the committee if it is the pleasure of the association.

DR. NEWSOM: I think what has been said only bears out the statement I made a while ago, that this body is not capable of selecting this committee, and I think that any of the other ways suggested would be better, either the in-coming or the present president, should appoint this committee. I move as a substitute for all pending motions, that the in-coming president appoint this committee just as he would all other committees of the association. Seconded by Dr. R. C. Moore.

DR. DUNPHY: If this association is not capable of appointing proper members for the committee, how should they expect the selection to be made by the president? If this association is not capable of electing a committee for that purpose, they certainly should not have a voice in the choice of electing a president.

DR. R. C. MOORE: Mr. President, the point is to select the men best capable of doing the work and I have to differ with Dr. Dunphy on this question. We are capable as far as that is concerned but have we time to consider who are the men best adapted for this particular kind of work? I don't believe we are sufficiently acquainted with the personnel of this association for this purpose. I believe that the president is the man who should appoint this committee and therefore, I want to second Dr. Newsom's motion.

PRESIDENT MARSHALL: I think it will be necessary to put Dr. Newsom's question. It was a substitute for the original motion.

DR. MURPHEY: I would like to rise to a point of order. I do not think a substitute motion of this kind is in order.

DR. NEWSOM: I am satisfied that a substitute motion bearing on the question at issue is always in order and I feel that the motion should be voted upon.

DR. RUTHERFORD: Speaking of a point of order, Mr. President, I would say, a substitute motion is in order but if anyone offers an objection, it is not in order.

DR. MURPHEY: Mr. President, I object to the point of order.

DR. HOSKINS: Mr. President, there ought not to be any great discussion about the constitution of this committee. It is a committee, as has been said by some of us here, which ought to be selected with the greatest possible care, as to the influences the men may wield in doing this work. Dr. Melvin, who is the chief of the Bureau of Animal Industry would be a valuable member of this committee. We want somebody from Canada, either my good friend Dr. Rutherford, or Dr. Torrance; men who are in touch with the profession, then we would want Dr. Walkley, one of the Bureau of Animal Industry and then we would want two or three others, who would represent geographic places of our association in the United States, in order that the work may be carried on in the most judicious manner. Might it not be well to leave this also to the joint consideration of the out-going and the incoming president?

DR. MAYO: Mr. President, I want to say that I know that the present president has given very careful consideration to the selection of men for the various committees that he has filled. Men who would work to the best advantage of the association. I believe that our in-coming president will do the same.

DR. SIMMS: Mr. Chairman, I would corroborate what Dr. Newsom has said in regard to Dr. Dunphy's remarks, in reference to the election of a president. I feel that I am capable of voting for a president, but I do not feel that I know the personnel of the association well enough to know who was associated with Dr. Salmon, ten or twelve years ago when he left the Bureau. Therefore, I am opposed to the motion before the House.

DR. HUGHES: The thought has occurred to me as to whether it might not be well by looking over those assembled here to check over in one's mind a certain number who were closely associated with Dr. Salmon. Here on my left is Dr Meyer, also Dr. Hoskins and Dr. Rutherford and I see several others. Why not appoint a committee of those old timers. They knew more about Dr. Salmon than we. I would suggest appointing three men as a nominating committee and let them report back to this association. I make an amendment to the motion to that effect.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion. Did anybody second it? The amendment is made by Dr. Hughes that a nominating committee of three be appointed. Seconded by Dr. Fox.

DR. DUNPHY: Mr. President, I would be willing to accept Dr. Hughes' amendment to my own motion provided my seconder will accept this.

DR. FAUST: I seconded the motion that the association should select the five members.

PRESIDENT MARSHALL: Are you willing to accept the amendment that a nominating committee of three be appointed to select the committee?

DR. FAUST: Yes.

PRESIDENT MARSHALL: The amendment has been accepted by the original mover and seconded. Now you have heard the proposition that a nominating committee of three be selected by the president and that they offer the names of five men to be selected by the association. Any remarks?

DR. KINSLEY: Is this going to simplify matters after all? I cannot see that we are gaining much.

DR. MURPHEY: It seems to me that we are on the right track. A nominating committee chosen by the president, composed of men who are able to judge of the personnel of this committee, is the very best way to handle it. Two things must be considered in selecting this committee. First, the kind of men to be appointed and their location with respect to their ability to meet with the other members and take active part in carrying out the work. A good many men no doubt would be highly valuable on this committee who cannot spend the money to come a long distance to attend to the business of it.

PRESIDENT MARSHALL: All those in favor of the motion as amended, signify by saying, "aye", opposed "no". The "ayes" have it; it is so ordered.

DR. LOCKETT: I move that the nominating committee be appointed now and that the election take place at the afternoon session. Seconded by Dr. Fox.

PRESIDENT MARSHALL: It has been moved and seconded that the nominating committee be appointed now and that the election of the committee be held at the afternoon session. All those in favor of the motion, signify by saying, "aye", those opposed "no". The "ayes" have it and it is so ordered. If you will give me a few minutes to think it over, I will appoint the committee. The secretary is present now and desires to make a report of the executive committee.

DR. HUGHES: Mr. Chairman, I rise to a question of information. I would like to know definitely as to when the election of officers will come up today.

PRESIDENT MARSHALL: I am glad you brought that question up. Several members suggested we hold the election at four o'clock this afternoon after the Symposium on Influenza, that is the only thing which we have on the program for this afternoon. Some members want to go home, some want to go to the Fair and do other things and do not like to be required to attend this evening session. Now if we change the election to four o'clock it will take unanimous consent to accomplish it. I want you to think that over. I will ask you to vote on it now if you are prepared to do so.

DR. HUGHES: I would like to know whether the time is specifically set in our constitution and by-laws.

PRESIDENT MARSHALL: No, not in the constitution and by-laws.

DR. HUGHES: Who is it then that regulates this time, is it not the association?

PRESIDENT MARSHALL: It was printed in the program that the election of officers would take place this evening.

DR. MAYO: The constitution and by-laws gives the order of business as follows: First, roll call, second, submission of the minutes of the previous meeting as presented in the annual report and other records kept by the secretary, etc.; it is not necessary for me to read them all but after the reading of papers and discussions, follows the election of officers, installation of officers, adjournment. In the official program, I did not put this in because it is provided for in the constitution and by-laws. The arrangement made on the local program is to have the election of officers the last thing before adjournment because it is regularly provided for as the last official business of the general organization, except the installation and adjournment.

PRESIDENT MARSHALL: I do not understand that the order of business refers to the whole meeting but to the regular sessions as we have them and we follow that plan and order of business for the day. I talked to some members and they consider the order of business for the whole meeting, the four day meeting is the one to follow.

DR. HUGHES: I move that the election occur this afternoon at two o'clock instead of at seven-thirty this evening. Is there objection to this?

PRESIDENT MARSHALL: Yes, probably you have overlooked the symposium scheduled for two o'clock. That is not a general meeting. It is a symposium of the two sections. I think we might call a general session for the election at four o'clock after the session is finished.

DR. HOSKINS: I accept that as an amendment.

PRESIDENT MARSHALL: Would that be acceptable to you, Dr. Hughes?

DR. HUGHES: I accept the change.

DR. RUTHERFORD: I beg to move that the election of officers be held as set forth in the program. I know a number of men who are not here this morning and who won't be here this afternoon, who are not particularly interested in any of the work going on today but who are under the impression that the election will be held this evening as set forth in the printed program, and have made their arrangements accordingly, and are expecting to be here and take part in the election. I think it is a dangerous precedent indeed to move forward an election. If a man misses a paper or discussion, he gets over it, he can read it later but in the matter of missing an election, which has been scheduled for a certain time and which has afterwards been set forward, that is a very different matter. He is apt to feel that he is being the victim of some sort of a plan to deprive him of his rights without due notice and warning. If you were setting the election back a few hours, it would not matter so much but to move it forward, is a very dangerous custom to establish. I question very seriously the advisability of making a change and therefore, I move that the program stand as set forth.

PRESIDENT MARSHALL: I think under the rules that if anybody objects to advancing the election, it is not permissible. We will have the election to-night at seven-thirty. Dr. Rutherford will now read his report on the International Tuberculosis Commission.

President of the American Veterinary Medical Association.

Sir:

We beg to present the report of the International Commission on Bovine Tuberculosis, covering the period since the last meeting of the association. The commission has not met during the intervening period, owing to the fact that it scarcely appeared worth while to call the members together in view of the comparatively small amount of work which, under existing circumstances, they could have performed.

The commission has felt that its principal duty was performed when in 1910 it presented to the association the comprehensive report which has since been published and widely distributed throughout both the United States and Canada.

For some time, the members have been considering the question of the advisability of continuing or discontinuing the commission. The general consensus of opinion among the members is that it will be in the best interests of all concerned to perpetuate the commission with such changes in its personnel as the association may deem advisable.

While as has already been stated, nothing of outstanding importance has presented itself in connection with either the pathology or the general control of bovine tuberculosis, there are one or two matters which it is felt should, from this time on, receive consideration at the hands of the commission. Among these, perhaps the most important is the securing of satisfactory and comprehensive evidence as to the reliability of the various new methods of using tuberculin as a diagnostic agent and it is felt that the evidence so far available in this regard is somewhat conflicting, and that it should be the duty of the commission to satisfy itself upon the subject and make a public pronouncement in accordance with its findings.

A number of the members have attended comparatively few of the meetings of the commission and it is felt that, in view of this and other circumstances, it will be advisable to make some changes in the personnel of that body and also to make a numerical reduction in the membership.

Without going into details, we beg to recommend in this connection that, subject to the approval of the association, the names of the following gentlemen: Messrs. J. W. Flavelle, L.L.D.; Charles A. Hodgetts, M.D.; and J. N. Hurty, M.D. be dropped from the list of members, that the Hon. W. D. Hoard and Hon. W. C. Edwards be continued as honorary members, and that the following gentlemen be added to the working membership of the commission: Mr. John R. Valentine, of Pennsylvania; J. H. Grisdale, Director, Experimental Farms of the Dominion of Canada; Dr. F. S. Tolmie, of Victoria, B. C.

Respectfully Submitted,

J. G. Rutherford, J. R. Mohler, V. A. Moore, F. Torrance.

September 1st, 1915.

In explanation of the foregoing suggestions, I would say that Messrs. Flavelle and Hurty, have both asked that they be relieved from service on the commission and as neither of them have shown any special interest in the work, I do not think their wishes in that connection should be disregarded. Dr. Hodgetts is now at the front; Mr. Hoard is now seventy-nine years of age and asks to be relieved on account of physical disability. Mr. W. C. Edwards, though not so old, is now in a similar position. As to the additional members, I might say, Dr. Tolmie, of British Columbia, has been for some years, president of the Provincial Agricultural Society. He is a man who has a very great and wide influence. I might say that this report is signed by Dr. Mohler, Dr. V. A. Moore, Dr. Torrance, and myself. We being the four members of the commission present, and we feel in view of the work which has been done officially by the British Columbia Government in the endeavor to stamp out tuberculosis in that province, that it ought to be recognized in that way by the addition of Dr. Tolmie on that commission. I think most of you are familiar with the names of the other members of that commission. It is very fairly well balanced up. Representing the veterinary profession in the United States, we have Dr. Mohler, Dr. V. A. Moore, Dr. Reynolds, and Dr. Ravenel and Dr. Schroeder from the Experiment Station at Bethesda, Md., and representing the profession in the west, we have Mr. Tomlinson, Secretary of the Live Stock Association and today giving the veterinary profession very valuable support in connection with this work, together with the work generally of stamping out and controlling contagious diseases among animals in the United States. We have also Mr. Ferguson, who is Secretary of the United States Sanitary Board. In Canada, we have Dr. Torrance and myself, as well as Dr. Tolmie. So that with the addition of Mr. Grisdale and Mr. Valentine, it leaves four members in Canada and six in the United States. Of course we have no desire to dictate in any way to the association, either as to whether or not this commission shall be continued or who its members shall be. We are simply giving this as a suggestion in view of the fact, that having been associated with the work now for some six years, we feel that perhaps we understand the exact situation better than otherwise would be the case.

DR. NEWSOM: Mr. President, I move the adoption of the report. Seconded by Dr. R. C. Moore.

DR. STANGE: I would like to amend the motion that we not only receive the report but accept the recommendation.

PRESIDENT MARSHALL: Do you accept the amendment?

DR. NEWSOM: Yes.

PRESIDENT MARSHALL: The amendment has been accepted by the mover and seconder that we not only accept the report of the committee but that we approve it. Any remarks?

DR. EAGLE: I would like to ask, are we taking a veterinarian off that commission in order to place the name of John R. Valentine on it? If so, I would like to ask if he is the Valentine who is connected with the Armour Packing Company.

PRESIDENT MARSHALL: I think I can explain Mr. Valentine's position. He is a gentleman farmer near Philadelphia. He has a large herd of Ayrshire cattle and has done good work in keeping disease out.

I suggested Mr. Valentine's name myself. I have been familiar with Mr. Valentine's work for a number of years and he has assisted us in every way possible to get laws and regulations for the handling and controlling of disease. He has been a most intelligent layman.

DR. EAGLE: I asked if he is the man who is connected with the Armour interests.

PRESIDENT MARSHALL: No, he is a gentleman farmer and has no connection with the Armours or any one else.

DR. HUGHES: The gentleman to whom Dr. Eagle no doubt refers as connected with the Armour Packing Company, is D. A. Valentine.

PRESIDENT MARSHALL: You over-looked the question in reference to whether he is replacing a veterinarian on the commission.

DR. RUTHERFORD: No, he replaces the Hon. W. D. Hoard, who becomes an honorary member.

PRESIDENT MARSHALL: Any other question or remarks? If not, all those in favor of the motion and adopting the report as suggested by Dr. Stange, say "yes", opposed "no". The "ayes" have it; it is so ordered.

The next order of business is the report of the executive committee.

DR. MAYO: Mr. President, it was moved that the president of the association be authorized to appoint delegates to attend conventions of other associations having a similar interest when in his judgment it would promote the welfare of this association. I would say in this connection that a member of the association frequently requests the president to appoint delegates. It is understood that they are to go at their own expense and that there will be no expense charged to the association in order to attend these conventions, for instance, cattlemen's convention, pharmaceutical associations and other similar bodies, the president has assumed that authority in the past and this action on the part of the executive committee merely gives the authority of the association to do that so that the delegates so appointed will be properly accredited.

DR. KINSLEY: I move that the recommendation be adopted. Seconded.

PRESIDENT MARSHALL: All those in favor of the motion signify by saying "aye", opposed "no"; it is carried, the "ayes" have it.

DR. MAYO: Invitations have been received to hold the next convention at the following places: Baltimore, Cincinnati, St. Louis, Columbus, Boston, Detroit, Kansas City, and some other cities. It is moved to refer these invitations to the in-coming executive committee.

PRESIDENT MARSHALL: I would like to add the name of Philadelphia to that list if it is not too late.

DR. MAYO: I said several other cities.

PRESIDENT MARSHALL: If there are no objections the name of Philadelphia will be added as suggested.

DR. MAYO: It is recommended that the President of the association appoint a committee of three to consider and report upon an emblem for the association to report at the next meeting.

DR. HOSKINS: I move that the recommendation be approved. Seconded by Dr. Fox.

PRESIDENT MARSHALL: It has been moved and seconded that the president of this association appoint a committee of three to consider and report upon an emblem for the association. All those in favor of the motion, signify by saying "aye", opposed "no". The "ayes" have it; it is so ordered.

DR. MAYO: Proposed amendment to the constitution and by-laws. Resolution by Dr. Baker.

"Whereas the renting of a hall has been left to the local committee at the place at which the meeting has been held and the expense thereof has been in the past borne by the local committee, be it

"Resolved, that the expense of such hall in the future be paid by the American Veterinary Medical Association."

DR. KINSLEY: I move that the recommendation be adopted. Seconded by Dr. Newsom.

PRESIDENT MARSHALL: Any remarks? If there is no objection, it is so ordered.

DR. LYMAN: That is an amendment to the by-laws?

DR. MAYO: Yes, it has been on file two years. The resolution was presented by Dr. Baker at the annual meeting.

"Resolved, that the annual dues of this association be raised from three to five dollars a year."

It is recommended that the proposed amendment be rejected.

DR. KINSLEY: I move that the recommendation be adopted. Seconded by Dr. Hughes.

PRESIDENT MARSHALL: Any remarks.

DR. MURPHEY: In view of the action of the association in taking on a new Journal and possibly one or two things that may come up later, I think that we ought to raise the assessment to five dollars and not have the officers

embarrassed to the extent they have been in the past to secure sums for the publication of a Journal and to do the other necessary business of the association. I think it detracts from the dignity of the association to have this embarrassment over lack of funds.

DR. KINSLEY: The committee has not reported on the Journal but I suspect from this action they expect the Journal to be paid for in addition to these dues. Is that right, Mr. President?

PRESIDENT MARSHALL: You are wrong.

DR. KINSLEY: Does the price of three dollars include the price of the Journal also?

PRESIDENT MARSHALL: I understand so.

DR. HUGHES: As I understand the matter, gentlemen, our treasury is in an absolutely impoverished condition. The other day at a little meeting of the faculties we were informed that we are indebted to a number of veterinarians of various places, who have advanced money in order to carry on the work of the faculties and examining boards and having a little dislike for debts of any kind, we naturally looked around to see how we could get hold of one hundred and four dollars in order to pay what we owed. We could not decide as to how that should be done. It is true we chipped in a little money and got about thirty dollars. Then the suggestion was made that we could make a request of the executive committee to come to our aid. I don't know what the executive committee has done about it but this hand to mouth business is a poor method to say the least. We should surely have a little balance to our credit. As it is now, we are running on credit. It seems to me that none of us will suffer by this little matter of raising the dues from three to five dollars, while at the same time, it will put the association on a business basis.

DR. STANGE: Mr. Chairman, is there not a provision in our by-laws for special assessments? If there is indebtedness and if it is necessary to raise more money, a special assessment for one year for the additional expense to take care of the starting of the Journal, could be very easily accomplished and then when the Journal was put upon a paying basis, we would be back on our old basis of three dollars a year for dues. I think there is a feeling that after this Journal is started the expense of carrying on the association would not be as much as it is now. It seems to me the special assessment plan would be a much better one than to raise the dues to five dollars on a permanent basis.

DR. ELLIS: In many of the organizations to which I belong, we are paying much more than five dollars a year and getting a very small return in comparison with what we get from this organization. I think we ought to make that little change to five dollars. It is not much compared with the benefits we get from an organization of this kind. If you find you have too much money in the future, you can easily go back but it seems to me from the condition of the treasury as has been reported for the last two years that two dollars a head additional would fill up the gap and put the association in very fine shape for the present.

Furthermore, I do not think the members will miss the money.

DR. HOSKINS: I hope you will reject the recommendation of the executive committee. The measure of usefulness of an association is always of course, evidenced by an empty treasury and we have had practically an empty treasury for two years. On one of the committees of which I was chairman, for which the association had been good enough to appropriate money, I could not get the money and did not get the balance of it until a few weeks ago because there was no money in the treasury. I did not let the work drop because of lack of funds but I found it necessary to raise the money myself. We ought to be doing a great deal more work than we are doing. There is work waiting for us everywhere but there is a lack of means to do it. We could not get enough out of the association in 1913 to give extra copies of the report to the association faculties and examining boards in order that we might send a copy of what we had done to the various members of the boards, which is changed all the time. For more than twenty years the fee of this association was five dollars. In my opinion, it ought never to have been reduced because it curtailed our work from time to time. When we send a book to every member, costing from two to two-fifty, which is the actual cost, leaving nothing but the initiation fee and the balance of the annual dues for work, you can readily see we are just simply eliminating the work that ought to be done and is waiting to be done. We are two thousand or more in membership now and those two thousand men are able and willing to increase the amount of the fee in order to put the association on the proper financial basis and give it funds for the carrying out of the wishes of the association. I trust you will reject this recommendation of the executive committee and adopt the one making the dues five dollars a year.

DR. JENSEN: I desire to make it clear I am not speaking from any personal motive because I assure you I am able and will be delighted to pay the five dollars a year but I fear some of our members are not in my position and as much as a man might feel an inclination to do his duty in this matter, if he has not the finances, it is impossible for him to pay the additional money. Our secretary tells me that even at the present time, he finds it quite difficult to collect the dues. If I had any degree of assurance that the general membership would take kindly to the raising of the dues, I would say, amen, let us make it five dollars; but suppose we raised the dues and this might result in the loss of a great many members. Would it pay? I would like to add to this that the annual cost of the publication of the proceedings of this meeting has been very large. In fact, I think the last issue cost something like four thousand dollars. It is proposed to publish a Journal and we have it figured out pretty well, that this Journal, within a reasonable length of time will be absolutely self-sustaining. Thus, taking the burden off the association of four thousand dollars a year. I want you to understand, gentlemen, I am not objecting to the two dollar raise personally. I think we ought to look at things from the viewpoint of the membership. I feel it may be detrimental to the association if we raise the fee to five dollars. •

DR. FAUST: Mr. President, in looking over the treasurer's report, I noted there was a balance of one thousand dollars to carry on next year's expenses and there were three thousand and some odd dollars left two years ago and

out of that the expense of two years has been paid. If we had to publish the proceedings of last year, we would have been about three thousand dollars in debt, and if we kept on in this way, we would certainly come to disaster.

DR. MAYO: We have nineteen hundred and sixty members and we have just taken in more than two hundred and fifty, therefore, it would make our membership a little over two thousand two hundred.

DR. FAUST: That would make the proceedings alone cost two dollars a member to print and I don't see how we could expect to get out with the three thousand dollars.

PRESIDENT MARSHALL: There will be a Journal next year.

DR. TYLER: In view of the added obligations which this association has assumed,, it seems to me wise to increase the annual dues. We have established by the action of this association a Journal to publish the reports and so on. There is a remote possibility as I understand it that this Journal may not be self-sustaining, but even if that is so, if these members are receiving their value received by this increase, what difference would that make? If there was a new Journal established they would receive that Journal practically for the two dollars additional. It surely will be worth two dollars a year. If this association or the committee appointed should conclude to assume control and take over one of the existing Journals, (I don't know that that is true,) but in case they should, they would take over the Review, which is three dollars a year or the Chicago Journal which is two dollars. In view of the fact that most of our members are taking one or both of these papers, the increase of the dues to five dollars would really be a saving to us in the end, because we would save the price of one or both of the Journals. If the Review should be taken over by us and we increase the dues to \$5.00, it is an increase of \$2.00. We, in turn make a saving of \$3.00 because if you do not take the Review, you ought to. There is a net profit to each member and I don't see how this association stands to lose anything by raising these dues two dollars more.

The members are bound to get value received either in a new Journal or in an old established Journal because the minute we take it over we discontinue our subscription to Dr. Ellis.

DR. SCHULTZ: I am one of those who only occasionally am able to attend your meetings but personally, I think a book containing the proceedings is well worth three dollars to anybody out in the field because it is a representative publication containing the articles that have been sifted through and are written in an unbiased manner; therefore, you give me equal value in the three dollar book when I pay the three dollars. No business proposition can advance nowadays unless it has money because we wish to live better today than we did twenty years ago, so I am in favor of raising the dues and I can assure you that the men in the field will read the Journal. It is well worth the two dollars a year. If you are going to add a Journal, I think five dollars is not too much. Five dollars is nothing. Raise the dues so that your association will have more means and will be on a better business basis and therefore increase its efficiency to delight its members who are out in the wilderness.

DR. MAYO: I would like to explain to you, the situation as shown by the treasurer's report. On the first of August I turned over, as secretary, all the dues in my hands to the treasurer and his report shows that when he closed his books there was eleven hundred dollars in the treasury. There were also probably bills that had not been paid already in his hands amounting to about five hundred dollars. Since the first of August the statement for dues for the coming year have been sent out and I had in my hands, two thousand dollars and a little more. These are dues that have been paid for the coming year. In sending out the statements for dues for the coming year, I included an official copy of the program in which the proposed amendments to the constitution were included. Of course, a good many in sending in their dues hoped they would not increase the dues. We will lose some members by increasing the dues unquestionably. However, I feel confident we will get much more money than we will lose in membership by this change. The executive committee in reporting on this, I believe, felt, that at the present time when we were launching a new enterprise which they hoped would prove remunerative, and I believe it will, if not the first year, eventually, that it was better not to increase the dues at this time.

DR. EAGLE: Mr. President, I would like to offer a suggestion along that line. I am like Dr. Jensen. I am willing to pay that two dollars and I believe a great many members are in the same position but I believe it would be a good idea to have a vote of all members of the association on the proposition. Why couldn't we have a postal card vote on the proposition? I think it would be well to state on this postal card what they are going to receive in the way of a Journal and other inducements to increase this assessment to five dollars a year.

DR. R. C. MOORE: I believe it would be a good idea if we could postpone the consideration of this recommendation until after we hear that report. If we raise the dues now, when does this change take effect? Dr. Mayo has just told us that a good many of the members have paid their dues for the coming year. Do we go back and ask these new men to increase their dues if this change is made?

DR. MAYO: In reply to the question of Dr. Moore, I will state that if this provision carries and is passed, as I understand it, it will not take effect until a year from this first of September. The committee discussed that and it felt that if they needed money, they would need it before that time and they have authority now to levy a special assessment if it is needed. By another year we shall be in a better position to say whether the Journal will be remunerative or not. Personally, it does not make any difference to me whether you raise the dues or not. The secretary, whoever he may be, has some difficulty in collecting the three dollars dues and of course, it will increase his difficulty somewhat but not materially. I think they are going to be pretty good about paying their dues.

DR. BAKER: When the report was made that this association was hard up, it struck me that something ought to be done to relieve the financial stress. Now there are only two ways of increasing our income. One is to raise the

annual dues and the other is to levy an assessment. I am opposed on general principles to levying special assessments. I think we ought to raise the dues to where they were before they were reduced. They were originally five dollars and reduced to three, if I remember right, at my suggestion. I fathered that resolution through. That action was taken at the time when we were having very hard times when horses were comparatively worthless. Now we have got back on our feet again and the purchasing power of a dollar is much less than it was when this reduction was made to three dollars. The high cost of living makes it necessary for the association to have a little larger income than when the reduction was made so I sincerely trust that you will all vote for my resolution although with great respect for the wisdom of the executive committee, I think they have taken too narrow a view of this situation.

PRESIDENT MARSHALL: The question has been called for. Those in favor of accepting the recommendation of the executive committee —

DR. MAYO: The recommendation is Dr. Baker's resolution to amend the by-laws so that the annual dues of this association be raised from three to five dollars a year. The recommendation of the executive committee is that this resolution be rejected so that if you vote "yes" on this report of the committee, you reject the raise of dues and leave it at three dollars a year.

PRESIDENT MARSHALL: Will you accept the recommendation of the executive committee?

DR. HOSKINS: Remember gentlemen, those who vote for accepting the report of the committee and say "yes" vote to leave the dues at three dollars. If you want to raise the dues to five dollars, you want to vote "no" on this proposition, and if you want to keep the dues at three dollars vote "aye."

PRESIDENT MARSHALL: All those in favor of accepting the report of the executive committee, which means that the dues will remain at three dollars, make it manifest by saying, "aye", those opposed, "no".

I decide that the question is lost.

DR. BAKER: I move the adoption of the resolution.

DR. KINSLEY: I call for a standing vote.

PRESIDENT MARSHALL: A standing vote is called for. Those in favor of accepting the recommendation of the executive committee, will please stand. "Ayes", thirty six. Those in favor of accepting the recommendation of the executive committee, thirty-six. "Noes", forty-five.

DR. MAYO: Those voting in favor of accepting the report of the executive committee, leaving the dues at three dollars, are thirty-six. Those voting against, are forty-five.

DR. BAKER: Mr. President, I move the adoption of the resolution.

DR. KINSLEY: What does that mean? Adopt this change in the by-laws?

PRESIDENT MARSHALL: Amendment of the by-laws by raising the dues to five dollars. That is all the amendment does.

DR. BAKER: This motion is made for the purpose of making it operative.

DR. ANDERSON: I second the motion.

PRESIDENT MARSHALL: Any remarks? Those in favor of adopting the amendment, make it manifest by saying "aye", those opposed, "no". The amendment is adopted.

DR. MAYO: Another amendment to Section 5, Article 3, of the by-laws to read as follows:

"The Secretary shall receive an annual salary of seven hundred and fifty dollars and such expenditures as may be necessary at the attendance at the annual meeting following his election." It was recommended by the executive committee that the proposed amendment be not adopted.

DR. HOSKINS: I move that the recommendation of the executive committee be adopted.

DR. NEWSOM: I second the motion.

PRESIDENT MARSHALL: Gentlemen, you have heard the recommendation of the executive committee. Any remarks?

DR. KINSLEY: Please explain what that means.

DR. MAYO: It leaves the salary of the secretary as set forth under the constitution and by-laws, five hundred dollars a year and expenses to the convention for the year in which he is secretary.

DR. KINSLEY: It seems to me since you have raised the dues it is no more than right that this should be voted down and increase the secretary's salary.

DR. JENSEN: At the time this resolution was passed by the executive committee, we had voted to retain the three dollars dues and I am very much inclined to think with Dr. Kinsley that the secretary has earned the additional salary, at least he is going to have more work in collecting the dues and I think he should have the increase.

DR. HUGHES: It seems to me that the salary of the secretary is ample as it is, five hundred dollars and expenses.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion to accept the recommendation of the executive committee. I wish to say in regard to the matter of expenses, the secretary has to pay all the expenses incident to the hiring of stenographers and everything in regard to the keeping of books and matters of that kind and this expense does not include the expense of the secretary's office except the purchase of stamps and all materials necessary.

DR. BAKER: It strikes me as being slightly ridiculous although perfectly natural, that when you increase your income you naturally increase your desires and increase your appropriations. I hardly think it is proper or exactly right that in the face of this increase in income you immediately jump up and increase the appropriation against the income, but that is human nature the world over. It is a question in my mind if the secretary is not sufficiently paid now. We do not want to have the secretary's office so lucrative that every one in the association will want it. I do not think it is in the mind of any man here that the secretary will be sufficiently paid for the work he does. It is a very onerous office. At the same time he is working philanthropically and magnanimously for the benefit of the association. Five hundred dollars is of course, little compensation for the amount of work which he necessarily must do.

DR. MURPHEY: I call for the question.

PRESIDENT MARSHALL: The question has been called upon the recommendation of the executive committee. If you are to accept the recommendation of the executive committee the secretary will get five hundred dollars, if you reject it, you have got something else to do. All those in favor of accepting the recommendation of the executive committee, make it manifest by saying, "aye", those opposed, "no." Division. The president is undecided and calls for a standing vote. All those in favor of accepting the recommendation of the executive committee, will please stand. Those who are opposed stand. Voting for the recommendation of the executive committee, forty-five. Against, twenty. The recommendation of the executive committee is sustained.

DR. MAYO: I have another recommendation of the executive committee, that in view of the fact that the Ontario Veterinary College has permitted an examination by the committee of this association, it is recommended that it be added to the accredited list of colleges recommended by this association and that the graduates for the year 1914 and 1915 be eligible to membership.

DR. KINSLEY: I move the acceptance of the recommendation. Seconded by Dr. Hughes.

PRESIDENT MARSHALL: Gentlemen, you have heard the recommendation of the committee on the motion. All those in favor of accepting the recommendation, signify by saying "aye", opposed, "no." It is unanimously accepted.

DR. MAYO: I wish to state that this committee also recommends as eligible to membership, those graduates in the past two years who have not been eligible heretofore so that if anyone asks you, you will know. The following recent graduates of the Ontario Veterinary College whose applications have been recommended for membership are now eligible: Dr. E. R. Zimmerman, W. A. Troutman, also the application to membership of Dr. E. E. Patterson of Detroit, graduate of the Detroit Veterinary College of 1901.

PRESIDENT MARSHALL: I would like to state that these applications were received in time but could not be acted upon until the recommendation was passed.

DR. KINSLEY: I move that the rules be suspended and that the secretary be instructed to cast the ballot in favor of admitting to membership the gentlemen whose names have just been read.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion. All in favor of admitting these gentlemen to membership, please signify by saying "aye", those opposed "no". It is carried.

DR. MAYO: According to instructions, I hereby cast the ballots of the association in favor of Drs. Zimmerman, Troutman, and Patterson, for membership in this association.

PRESIDENT MARSHALL: I declare them elected.

DR. MAYO: The executive committee recommends that Dr. Vallee, director of the Veterinary College at Alfort, France, Dr. W. A. Evans of Chicago, Illinois, and Dr. E. Wallis Hoare, F.R.C.V.S. of Cork, Ireland, be recommended for honorary membership in this association.

DR. HOSKINS: I move that the recommendation of the executive committee be accepted. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: It has been moved and seconded that the recommendation of the executive committee that Dr. Vallee, Dr. Evans and Dr. Hoare be elected to honorary membership in this association, be accepted. Any remarks? All those in favor of adopting the recommendation of the committee and of electing these men to honorary membership, signify it by saying "aye"; those opposed "no". It is carried. It is so ordered.

DR. HUGHES: I would like to make a motion, that the secretary be authorized to communicate with these gentlemen notifying them of their election to honorary membership.

DR. NEWSOM: I second the motion.

DR. MAYO: All applicants for membership are notified of their election, as well as honorary members.

PRESIDENT MARSHALL: It has been moved and seconded that the secretary be authorized to communicate with the gentlemen named notifying them of their election to honorary membership. Those in favor of the motion signify by saying "aye"; those opposed "no". The "ayes" have it. It is so ordered.

DR. MAYO: It was recommended that the standard set for matriculation by the Bureau of Animal Industry, Circular No. 150 be adopted as the matriculation standard for the A.V.M.A., beginning with the year 1916.

DR. MURPHEY: I move the adoption of the recommendation.

DR. HOSKINS: I second the motion.

PRESIDENT MARSHALL: It has been moved and seconded that Circular No. 150 of the Bureau of Animal Industry setting forth the requirements for matriculation be accepted as the necessary requirement for candidates for membership in the A.V.M.A.

DR. CAMPBELL: I rise to a question of information. I do not get clearly what this is. It was stated in a letter read in this meeting yesterday that new regulations had been put in force. Is this the new standard or the old standard?

DR. MAYO: It is the new one, which I will read:

"1. A matriculation examination shall be adopted by each veterinary college, the minimum requirements of which shall be equivalent to the first grade examination as published in the United States Civil Service Manual of Examinations. Such examination will therefore comprise:

1. Spelling
2. Arithmetic
3. Penmanship
4. Report writing
5. Copying and correcting manuscript
6. Geography and civil government of the United States.

"2. An applicant having a diploma from a recognized college or a normal or high school, or a first-grade teacher's certificate, shall be eligible for admission to a veterinary college without examination.

It is not deemed advisable to make this amendment effective at once, as colleges have already made their arrangements for entrance classes for the coming school year.

By direction of the Commission.

Very respectfully,

J. A. McILHENNY, President."

The adoption of this as our standard for admission into the association is recommended by the executive committee.

DR. STANGE: It looks to me as if this were an amendment to our by-laws. If I understand properly this must go over a year, and it cannot be adopted by the association as an amendment to the by-laws until a year from this meeting. This is simply recommended at this time.

PRESIDENT MARSHALL: In my opinion, that is the way it should be handled, as an amendment to the by-laws, and this is notice given that it will be brought up next year.

DR. HOSKINS: If we adopt it, why won't it appear on the applications for membership, to take effect in 1916 as provided for?

DR. MAYO: You understand this means, it will raise our requirements so that those entering veterinary colleges in 1916 must comply with these requirements.

PRESIDENT MARSHALL: Doesn't that mean it is an amendment to the constitution? I don't think Dr. Stange's question has been answered so we understand it thoroughly. Is that an amendment to the constitution? We have a section in the by-laws at present providing for our entrance requirements.

DR. MAYO: It will have to be acted on as an amendment to the constitution to be voted on next year.

DR. HOSKINS: It will appear in next year's announcements that we are going to act on it then.

DR. STANGE: Mr. President, I make a substitute motion that this be brought up at our next annual meeting to be acted on in the usual way as an amendment to the by-laws.

DR. HOSKINS: Is that necessary? If we adopt the recommendation of the executive committee it will come up next year in the same form that the two proposed amendments came up this year and then we make it a part of the by-laws of our association governing the question of eligibility for membership. Isn't that right?

PRESIDENT MARSHALL: I would like to ask how you amend the by-laws in that way?

DR. HOSKINS: It will be presented by the executive committee in the form of an amendment.

(To be continued)

ANNOUNCEMENT FROM THE LOCAL COMMITTEE OF THE A. V. M. A.

The local committee as it now stands is:

S. Brenton.....	Chairman
T. F. Krey.....	Secretary
Finance and Exhibits.....	W. A. Ewalt
Reception.....	G. D. Gibson
Entertainment.....	T. F. Krey
Hotels and Banquets.....	J. J. Joy
Program.....	G. W. Dunphy
Clinic.....	R. H. Wilson
Transportation.....	J. Hawkins
Press.....	J. Black
Registration and Badge.....	J. P. Hutton

While these are the heads of the various divisions, there are thirty-seven sub-committee men.

At a recent meeting of the committee, the Hotel Statler, which is particularly adapted for conventions, was selected as headquarters. It has four capacious halls fully ample to meet all requirements, which we have obtained for the entire week. The hotel has a thousand rooms with baths and is very reasonable in its charges. The committee believes the Hotel Statler will prove to be one of the best hotel quarters ever secured by the association. This hotel is centrally located, within easy walking distance of the principal stores, theatres, and all attractions. There are also a number of good hotels and rooming houses adjacent, which will provide ample room for all visiting members. These hotels are the Griswold, The Tuller, The Cadillac, The St. Clair and The Pontchartrain.

Following mature consideration of the program, the local committee found it essential to extend the convention another day—five days in all. It was thought advisable also, to have the convention convene on Monday morning, August 21st until Friday evening, August 25th, in place of from Tuesday, August 22nd to Saturday, August 26th.

The entire thirteenth floor, which is composed entirely of sample rooms, has been devoted to exhibits. It would be desirable, therefore, for any firms who intend to have exhibits at this convention, to secure space at an early date. Space can be secured either

through the committee or by writing to the Hotel Statler in care of Mr. Madlung, who will be glad to send a diagram of the floor upon request and reserve any space selected.

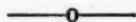
Detroit is a very popular convention city and during the summer months the hotels entertain many transient visitors. It is, therefore, desirable to make reservations as early as possible. The following rates apply to the Hotel Statler:

Single rooms for 1 person, with shower bath.....	\$1.50 per day
Single rooms for 1 person, with shower bath.....	2.00 per day
Rooms for 2 persons, with shower bath.....	3.00 per day
Rooms (outside) for 1 person, bath and shower.....	3.50 per day
Rooms (outside) for 2 persons, bath and shower.....	4.00 per day
Rooms (outside) for 1 person, bath and shower.....	3.00 per day
Rooms (outside) for 2 persons, bath and shower.....	5.00 per day
Rooms (outside) for 1 person, bath and shower.....	3.50 per day
Rooms (outside) for 2 persons, bath and shower.....	5.00 per day
Rooms (front) for 1 person, bath and shower.....	5.00 per day
Rooms (front) for 2 persons, bath and shower.....	7.00 per day

Depending on the size of room and location. All rooms are comfortable—400 of which having shower baths may be had at \$1.50 and \$2.00 per day for one person and \$3.00 per day for two persons.

Rates of the other hotels will be furnished at an early date. The committee will be glad to make reservations for any members.

T. F. KREY, Secretary.



SOCIETY MEETINGS

MONTANA VETERINARY MEDICAL ASSOCIATION

The mid-winter meeting of the Montana Veterinary Medical Association assembled in Bozeman in the Veterinary Building of the State Agricultural College on January 28 and 29. A very interesting meeting with good attendance was held. In addition to the routine business of the association, there was passed a resolution in favor of the Lobeck Bill, H. R. 5792 and the secretary-treasurer was instructed to convey the resolution to each member of Congress from Montana.

The regular program consisting of papers, addresses and discussions was then carried out as follows:

Dr. Howard Welch's address on "Avian Tuberculosis in Montana" and "Coccidiosis in Cattle."

Dr. Welch gave a very interesting account of his investigations of avian tuberculosis in which he enumerated a detailed study of a great many fowls, tracing the infection in certain flocks covering a period of several months, with uniform post-mortem lesions on fowls diagnosed by him as being affected with the disease, and demonstrated by several other autopsies before the association.

Dr. Welch stated that he expected to continue his research studies on avian tuberculosis and hoped at some future time to bring the subject before the profession and the public in a way that will convince them that this disease is far more prevalent among the flocks of poultry in Montana than has been formerly supposed.

Dr. Welch also reported some cases of coccidiosis discovered in the college herd and outlined the treatment which was successful in checking the disease.

Dr. Welch also stated that his investigations of the hairless pig plague had proven that enlarged thyroids invariably accompanied hairless pigs, and that out of a great number of post-mortems on normal pigs, the thyroids were normal and showed a full percentage of normal iodine, whereas, the thyroids of the hairless pigs showed a lack of iodine, or only small traces could be found. He further stated that his research studies along the line of hairless pigs would be continued with the belief that it would finally be proved that a lack of iodine in the food in certain localities would be a probable cause of hairless pigs.

The next address was given by Dr. W. J. Butler, State Veterinarian, on "Sanitary Laws and Regulations." Dr. Butler's address was full of earnest discussion, particularly of the Montana Statutes as they pertain to the live stock sanitation. He explained carefully the methods being adopted and exercised by the State Live Stock Sanitary Board for the regulation of these sanitary laws, and made many other perplexing problems plainer to the veterinarians than they had been before.

Dr. A. D. Knowles discussed the subject of the Veterinary Law of Montana," which was also discussed by the membership in general, there being a better understanding as a result of the discussion of the means used for administering the law.

Dr. F. B. Linfield, Director of the Experiment Station at Bozeman, delivered an address on the "Relation of the Agricultural Extension Work to the Veterinary Profession." Dr. Linfield's address was lengthy and well rendered, but the Doctor digressed

from the subject announced, as he said he wished to cover a still broader field than was comprehended in the subject. His address was full of scientific agricultural history and brought the subject from the beginning of scientific agriculture up to the present time, with many splendid illustrations of the gains made and improved conditions of the clients whom the veterinarians depend upon for their livelihood.

"Veterinary Biologies" was the title of a paper, the author of which was Dr. N. T. Gunn, and was read by Dr. C. H. Stevens. Dr. Gunn's paper showed that he had given the subject a very thorough, scientific and practical study, and while it reviewed fully the scientific side of the subject, his discussion of the choice of the various biological products for use in their various classes of diseases showed an intimate knowledge of their production and uses. The paper was discussed by Dr. Wipf and Dr. Brawner.

A very interesting and instructive address, illustrated by diagrams, was given by Dr. S. M. Smith, of the U. S. Bureau of Animal Industry, with headquarters at Mitchell, South Dakota, on the subject of "Hog Cholera and its Control." Dr. Smith laid special stress upon the methods being taught by him to the farmers throughout the district where he has been working, for controlling hog cholera without the use of serum, particularly instructing the stockmen how to carry out sanitary measures as certain prophylactics for hog cholera, the practice of which regulations, he frankly stated, had already reduced the disease to a minimum, and he gave it as his opinion that it would be the system which would finally eradicate the disease and eliminate the necessity of all forms of vaccination.

The association expressed its appreciation of Dr. Smith's address by adopting a resolution of thanks.

The association voted a minimum assessment of \$1.00 upon each member to be appropriated to the Salmon Memorial Fund.

A. D. KNOWLES, Secretary-Treasurer.

MONTANA VETERINARY MEDICAL ASSOCIATION

The Montana Veterinary Medical Association, at its eighth annual meeting, convened at Helena, September 22-23, 1915, passed a resolution favoring the collection of funds for the relief of members of the veterinary profession in Belgium and Northern France,

who have been thrown into poverty and distress by the present European War.

Dr. M. E. Knowles related his personal observation of the distress of those worthy members of our profession as he saw it during the early part of this year. Veterinarians who, previous to the present conflict, were pleasantly situated in honorable and lucrative practices are now working at any kind of labor they can obtain, trying to sustain the lives of their families.

Dr. Knowles read to the members present at the Helena meeting, copies of the Rules and Regulations of the Anglo-French-Belgian Veterinary Assistance Association which were adopted at Paris, France, May 12, 1915. This association was formed upon the suggestion of Dr. A. Liautard, who is well known to every veterinarian in America, and the committee at the head of the relief association is made up of the most prominent and responsible members of the profession in France: M. Chauveau, M. Lucet and M. Lavakard, who represent in high official capacities the principal veterinary associations in France.

I will quote from one of the above mentioned articles a portion which is particularly applicable to us here now:

"Dear Sir and Brother:—The frightful war which we suffer has brought about in all classes of society miseries of every sort, and like so many others, our profession has its share of mourning and of loss." In the presence of these facts, everywhere sentiments of altruism are awakened and everywhere groups have been formed to extend aid.

It is *this* which concerns us; the Society of Practical Veterinary Medicine began to study, last January, upon the praiseworthy and very generous initiative of our associate, M. Liautard, of the creation of a committee, having for its object to seek out means of coming to the aid, during and above all after the war, of our Belgian and French associates who are affected by the invasion or are victims of the hostilities.

The M. V. M. A. has authorized this office to bring this message to all members of this state, and to the officers of all other veterinary associations in America, urging voluntary contributions to be sent to this office which are to be forwarded to the proper authorities in France. Receipts will be given for contributions and proper recognition will be given to all who donate to this most worthy cause.

A. D. KNOWLES, Secretary-Treasurer.

ARKANSAS VETERINARY ASSOCIATION

The officers of the Arkansas Veterinary Association are Dr. George W. Temple, President, El Dorado, Arkansas and Dr. R. M. Gow, Secretary-Treasurer, Little Rock, Arkansas. The next meeting will be held in January, 1917.

The Arkansas Veterinary Association held its annual meeting in Little Rock, February 14th and 15th. Dr. X. G. May, Fort Smith, presided. This was the best attended meeting the association ever held. Addresses were made as follows:

Dr. C. D. Stubbs, Assistant Veterinarian of the Arkansas Experiment Station, subject: "Hog Cholera." This address was followed by a discussion on the same subject, led by Dr. J. E. Gibson, Field Veterinarian of the U. S. Department of Agriculture, and Dr. John D. Reardon of the Royal Serum Company, Kansas City, Kans. Dr. A. E. Wight, Federal Veterinarian in charge of Tick Eradication Work in Arkansas gave an address on "Tick Eradication." The subject of "Interstate Inspections of Live Stock" was taken up by Dr. R. M. Gow, State Veterinarian, and the discussion was led by Dr. X. G. May and Dr. J. L. Hearn of Texarkana, Arkansas. George Wilkes of the Mulford Company gave an address on "Serum Production."

The association passed a resolution asking for the passage of the Loeb Bill, a copy of said resolution being forwarded to the Arkansas Representatives at Congress. This bill was presented by Dr. J. E. Gibson.

Since the passage of the Arkansas Veterinary Practice Act which was passed by the 1915 Legislature, going into effect June first, 1915, there has been more interest manifested in veterinary practice and the Arkansas farmers and stockmen are bringing in better cattle and hogs and within the next few years, there will be openings in all our farming communities for qualified veterinarians.

R. M. Gow, Secretary.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of the Veterinary Medical Association of New York City was called to order February 2nd, 1916, at 9:20 P. M., by President Goubeaud in the lecture room at the Carnegie Laboratories.

In the absence of the secretary, Doctor Way was appointed secretary pro tem.

Twenty-eight (28) members present.

Minutes of the last meeting were read and approved.

The following gentlemen were proposed for membership and after being favorably acted upon by the Board of Censors, were elected to membership:—

Dr. O. R. Schueler, 1314 Jefferson Avenue, Brooklyn, N. Y.

Dr. David McAuslin, 1632 East 12th Street, Brooklyn, N. Y.

Dr. William Gall, Matawan, N. J.

Dr. J. J. Curran, 111 Powers Street, Brooklyn, N. Y.

A report of the Prosecuting Committee was called for. Dr. Gannett reported progress. Dr. Cochran as secretary of the committee reported that about one hundred letters had been sent out asking for contributions to the prosecuting fund. A total of approximately eight hundred dollars (\$800.00) had been pledged and twenty-one (21) contributions amounting to four hundred and fifty dollars (\$450.00) had been received. It was suggested by the committee to give temporary immunity from prosecution to young men who had recently graduated but had not received returns from their examinations for the State Board. The committee advised that they are endeavoring to raise \$1500.00. The Brooklyn men of the association, it was stated, have responded more promptly than the New York members.

A letter was read from Doctor McLean on this subject. Doctor Ackerman moved that the prosecuting committee proceed with this work and report once a year. Motion seconded and discussion followed. Moved by Dr. Griesman to table Dr. Ackerman's motion. Seconded and carried. Dr. Ackerman advised that he would offer at the next meeting an amendment to the By-laws calling for an annual report of the Prosecuting Committee.

PROGRAM. Dr. R. W. Gannett read a very interesting and instructive paper entitled "Botryomycosis." He took up especially the surgical treatment, illustrated his paper with very interesting specimens and brought out a very good discussion.

Dr. McAuslin reported a case of apparently recurrent botryomycosis after an operation. Dr. Blair spoke regarding the work of foreign investigators on this disease, bringing out the fact that a mixed infection is usually present and the specific organism of the disease causes an inflammatory condition, resulting in thickened connective tissue growths. Dr. Gill, Dr. Griesman and others took part in the discussion.

Dr. W. Reid Blair presented a most interesting paper illustrated with microscopic slides and specimens entitled "Sarcoma of the Heart in a Dog." Dr. Blair's paper brought out many interesting points regarding circulatory and respiratory diseases and he stated that it was his opinion that this infection was much more common than was generally considered by the average practitioner.

Dr. Gill discussed the paper with special reference to certain obscure respiratory cases in canines.

Dr. Roher, Dr. Gannett, Dr. Goubeaud and others took part in the discussion.

NEW BUSINESS. Motion made, seconded and carried that a vote of thanks be extended to Doctors Gannett and Blair for the very interesting papers of the evening.

Dr. Gannett moved the adoption of Dr. Berns' amendment to Article XIV of the By-laws as follows: In the second line strike out the word "three (3)" and substitute the word "five(5)" making the prosecuting committee to consist of five (5) members instead of three (3). Motion seconded and carried.

The president appointed Drs. C. E. Clayton and E. J. Decker as members of the prosecuting committee.

Dr. Ackerman suggested that there had been much valuable time wasted at the meetings in the past by discussing prosecuting committee work and indulging in personalities, etc. He advised that the question be considered of having fewer and better meetings. He suggested a meeting every three or four months to take up one afternoon and evening. Dr. Clayton considered the standard of the meetings rests in the hands of the members. He felt that the meetings might be made more interesting and attractive.

Moved by Dr. Gannett that a program committee of three (3) or more members be appointed to arrange programs in advance and endeavor to bring about more interest in the society. Seconded and carried.

Doctors Ackerman, Way, Clayton, Gill and T. E. Smith were appointed as program committee.

Dr. Way suggested that there was talent enough in New York County and vicinity to provide for the best local veterinary association in the state. He suggested that better and more interesting meetings would undoubtedly bring out a better attendance. A "get-together" dinner was suggested, where the members of the profession might become better acquainted and promote good fellow-

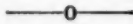
ship. Remarks along this line were made by the president and others.

The resignation of Dr. C. N. Darke was read and accepted with regret.

Dr. T. E. Smith made a few remarks regarding mule footed hogs. Specimens were exhibited and a general discussion was enjoyed.

Adjourned 11:25 P. M.

CASSIUS WAY, Secretary pro tem.



COMMUNICATION

TRANS-ATLANTIC SHIPMENT OF HORSES

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

May I warn, through the columns of the *Journal*, all veterinarians who are planning to accompany shipments of horses to the war zone to carefully investigate the transportation company having the matter in charge? I have recently returned from a trip of this kind and found the company most unreliable.

The salary is partly made up by bonus, though the latter is made practically impossible to gain because of there being included in the shipment a large percentage of horses already sick from influenza and strangles. The head foreman is placed in charge of each shipment and the veterinarian given no power over feeding, watering, etc. The supply of medicines, etc., is entirely inadequate. I believe a certain company was prevented, by the Society for the Prevention of Cruelty to Animals, from taking shipment from Yonkers, N. Y.

Altogether I do not think our brother practitioners should be employed by such companies. If there are others contemplating such a trip and desiring more complete information I can give further details.

Yours very truly,

F. M. PERRY,

Edgell Street, Framingham, Mass.

NECROLOGY

FRANCIS ABELE, JR.

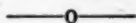
Dr. Francis Abele, Jr., died Sunday, March 26, at the Quincy (Mass.) City Hospital. He had been ill for some time, but an operation performed a few days previously, from which he failed to rally, probably hastened his death.

Dr. Abele was born in Roxbury, Mass., October 25, 1868, and received his early education in the public schools. He graduated from the State Normal School at Bridgewater in 1886. After teaching for a time he entered the veterinary course at McGill University at Montreal Canada. After graduation, he practiced in western Pennsylvania. Later, he returned to Massachusetts, and in 1895 he went to Quincy where he remained up to the time of his death. He was a member of the American Veterinary Medical Association. Since 1899 he had been an inspector of animals. He was a member of the Massachusetts Veterinary Medical Association; a district officer of the Massachusetts State Board of Health; a member of the Rural lodge of Masons of Quincy, and of the Boston City Club.

Besides his father and two brothers, a widow and two sons survive him.

Among the floral offerings was one from the A. V. M. A.

Dr. Winchester writes: "Dr. F. Abele, Jr., was high-minded, dependable, wedded to the profession, and a Man. I considered it an honor to have him as a friend and adviser."



RICHARD B. CORCORAN

Doctor Corcoran, a retired veterinarian of the army, died at the Letterman Hospital March 14, after a long illness. Dr. Corcoran was appointed in 1877 and had served in Indian campaigns and in Cuba. A friend writes that he was also in the Civil War; that he was well read, resourceful, well qualified for his duties and well known among the older veterinarians.

MISCELLANEOUS

Dr. W. Horace Hoskins wishes to express his heartfelt appreciation of the letters, cards and telegrams of congratulation in connection with the great victory for the recognition of our army veterinarians. As it is impossible for him to answer them individually, he wishes to take this method of expressing his thanks for the loyal, steadfast support and aid rendered.

The Massachusetts Board of Registration in Veterinary Medicine will hold its annual June examination of two days on Wednesday and Thursday, June 28 and 29.

Dr. F. C. Hershberger, now at Blagovestscheusk-on-Amur, East Siberia, has arranged with the Chinese government to work another year in Manchuria.

According to the Annual Report of the Maine State Board of Veterinary Examiners for 1915, fifteen men applied for registration. Four were graduates and eleven were non-graduates. As a result of the examination, three of the graduates and two of the non-graduates were registered.

Donnell & Palmer, 17 Battery Place, New York, are agents for the tenth issue of "The Argentine Year Book."

Dr. A. B. Haskins has located at 321 East Third St., Davenport, Iowa.

Dr. W. F. Jones for many years an employee of the Bureau of Animal Industry has resigned. Of late years he has been located at McCook, Nebr., in the Federal Live Stock Inspector's Service. Dr. Jones started as an inspector in the packing houses at Kansas City and was transferred to field service, and has been identified with the Salt Lake City and Denver stations. He has been on the sheep and cattle ranges, assisted in the outbreak of horse plague in Nebraska a few years ago and participated in the latest outbreak of foot and mouth disease. He is a member of the A. V. M. A. and will now practise his profession at McCook, Nebr.

COUNTRY FREE OF FOOT-AND-MOUTH DISEASE. Under date of March 31, the Secretary of Agriculture has issued an order which removes all foot-and-mouth quarantines and restrictions against the shipment and movement of live stock. The last area under suspicion was in Christian County, Ill. Authorities should be alert in case of any sporadic cases that may possibly develop in remote districts.

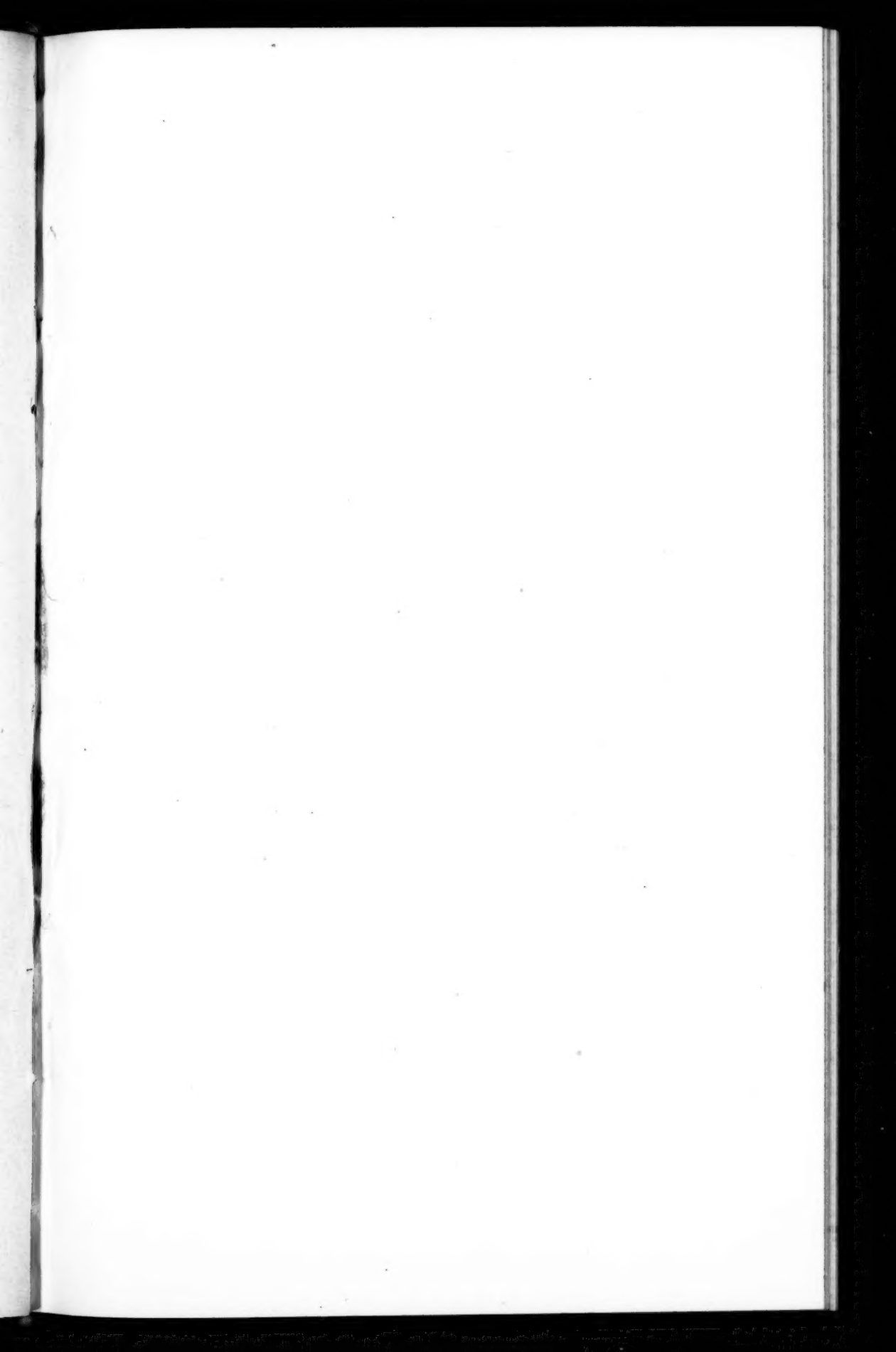
At the annual banquet of the Alumni Association of the U. S. College of Veterinary Surgeons, Representative Lobeck of Nebraska was announced to speak. Dr. Mansfield officiated as toast-master.

At a hearing before the House committee on rules relative to Representative Linthicum's resolution to authorize a congressional investigation of the dairy business, Doctors Melvin, Mohler, Rawl and Schroeder of the Bureau of Animal Industry, spoke in favor of the resolution. It was pointed out that there is considerable tuberculosis in dairy cattle and that the disease may be transmitted to children.

At the graduating exercises of the U. S. College of Veterinary Surgeons, Washington, D. C., D. W. McTyre of Virginia received the Rome Medal for general efficiency.

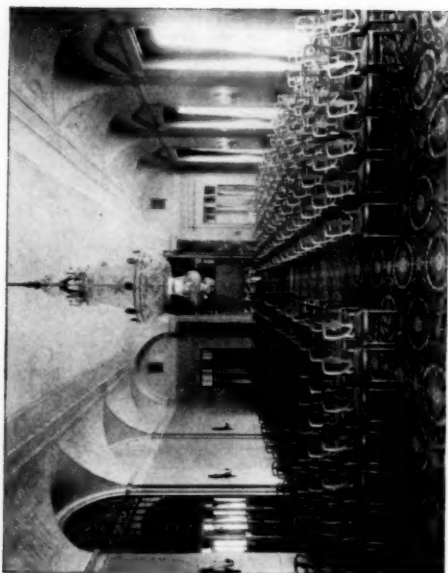
OX WARBLER IN CATTLE. This trouble has been largely confined to the cattle of the South. Recently the Bureau of Entomology of the U. S. Dept. of Agriculture has discovered that a second species, hitherto not found in this country but known to be even a more serious pest in Europe, has become well established in certain districts in the northern part of the United States. This European species is now generally distributed throughout New York and the New England states and a few specimens have been obtained from western Pennsylvania, western Maryland, southern Michigan, eastern Iowa and Missouri and western Washington. It is also generally distributed throughout southern Canada.

The loss from the warble is not limited to the holes the maggots cut in the hides. Extensive investigations in Germany and Denmark indicate that the losses through reduction in milk supply in dairy cattle, the retardation of growth in young stock, and the loss of flesh in all classes of animals are twofold greater than the damage done to the hides. Extraction of the grubs from the backs of infected cattle resulted in an increase of nearly 25% in the milk production, and a gain of more than 5% in weight over similar animals in which the pests were allowed to develop normally. At present there seems no better way of controlling the pests than through the systematic extraction and *killing* of the grubs. Investigations indicate that eradication may also be accomplished by the use of arsenical dips. In the northern states extraction should be begun in February and the herds gone over again about twice at monthly intervals. Animals transported from one section to another should be examined by the purchasers and all grubs destroyed during the spring and summer. In the winter and spring the grubs will be found beneath the skin on the back. At other times they are elsewhere in the body of the host, and it will be necessary to watch for their appearance during the following season.

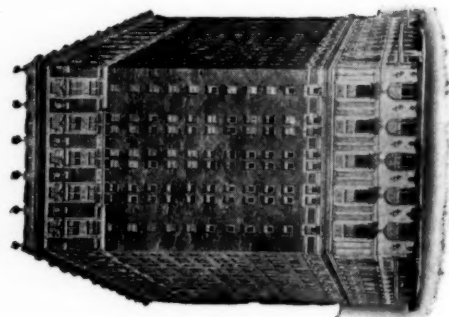




CAMPUS



CONVENTION ROOM, A. V. M. A.
STATLER HOTEL



THE STATLER HOTEL